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MODERN METALS

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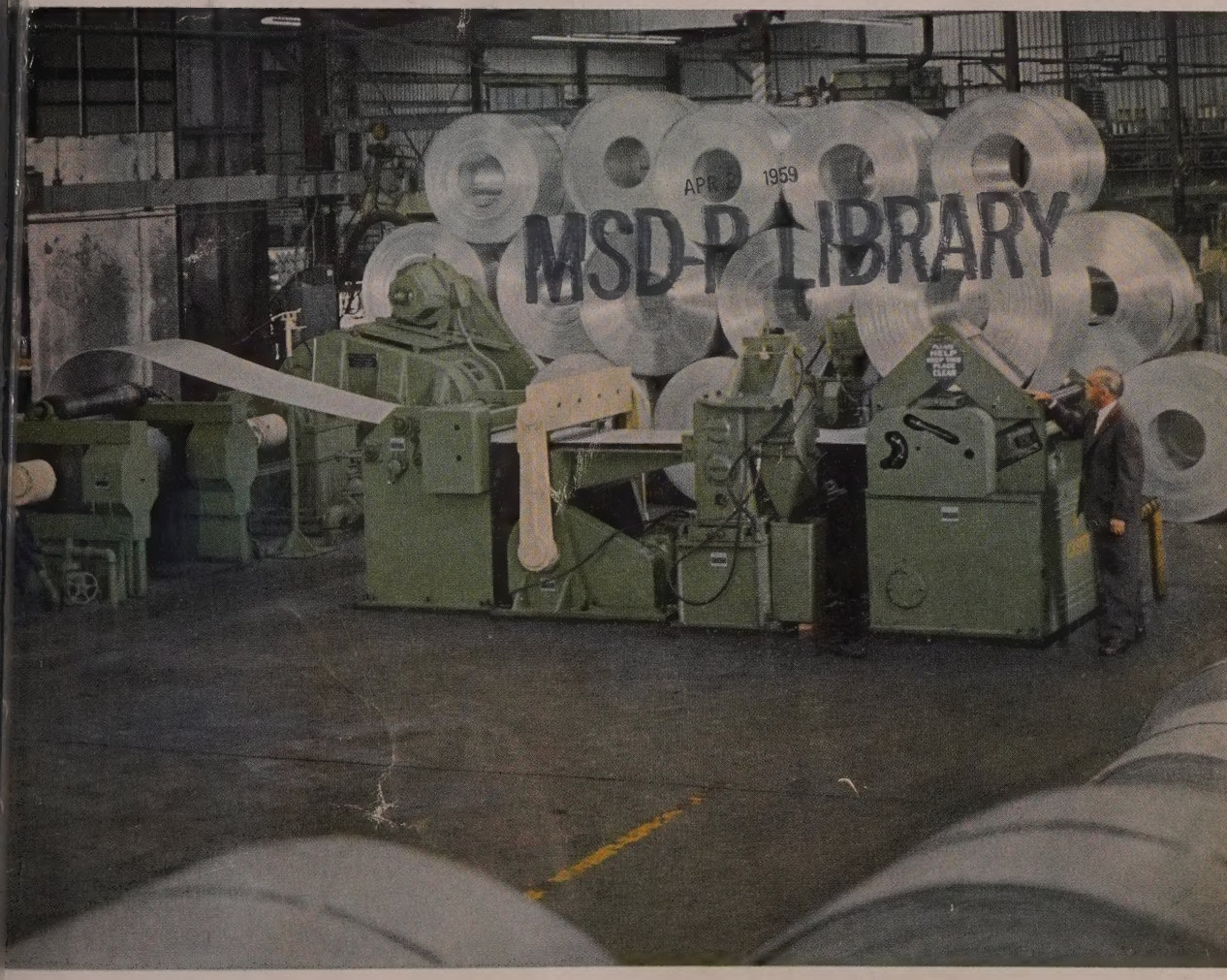

SHORTCUT to aluminum sheet

Hunter's continuous casting process converts molten aluminum directly into high quality quarter inch reroll stock. Potent impact on economics of aluminum expected. (see page 30)

First
FOR EXTRUSION TOOLS
CONTAINERS • LINERS • RAMS
Skill born of many years' specialized
experience joins with unsurpassed facilities
to make AJAX the logical first choice
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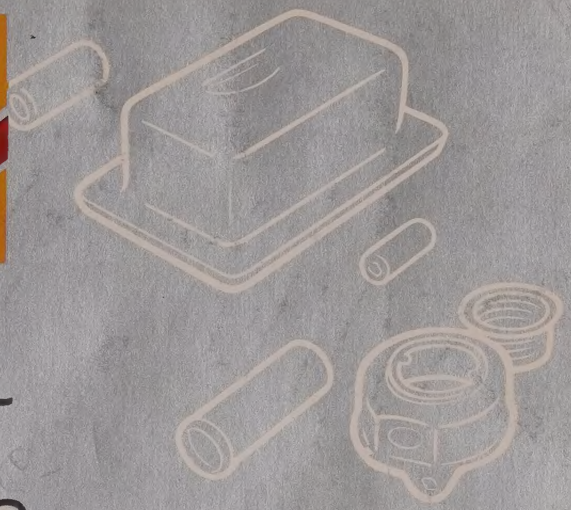
SCOVILL



has a word for the wise aluminum fabricator

THE WORD IS . . .

Truspec®

THE WELL-BEHAVED ALUMINUM SHEET

Aluminum is not new to Scovill. We were one of the very first mills in the country to start processing this new metal when it became commercially available in the late 1880's. But commercial Aluminum Sheet produced to the same closely controlled specifications Scovill established for Brass Strip was a NEW IDEA when we introduced TRUSPEC Aluminum.

Fabricators have long wanted Aluminum like this . . . because it can so effectively help them control such common problems as "earing" and "orange peel" effect . . . because it can reduce time-consuming adjustments and promote longer tool life . . . because Scovill has made available long-length coils (up to 100 lbs. per inch of width) and the sheet itself is remarkably uniform in gauge, from side to side and end to end.

Scovill believes the customer now gets what he wants . . . in TRUSPEC Aluminum Sheet identified by this Trademark.

it PAYS to specify...

BRASS • COPPER • ALUMINUM

MILL PRODUCTS

identified by this trademark

SCOVILL®

MADE IN U.S.A.
TO THE STANDARDS
OF AMERICAN INDUSTRY
★★★★★★★

made better to bring out the BEST in your products

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone PLaza 4-1171.

the well-guarded secret it's tough **NOT** to talk about

SCOVILL *quality can put you ahead of competition*

Many fabricators, having found Scovill Brass • Copper • Aluminum Mill Products definitely superior, try to keep their source of supply "a deep secret". This is understandable, when you consider the fact that a fabricator's best chances of licking tough competition usually lie in a LITTLE better production rate—a LITTLE better record on down-time, machine and tool maintenance—a LITTLE better quality end-product. All of these "little" improvements loom mighty BIG in the competitive picture—and all are entirely possible when you specify Brass • Copper • Aluminum mill products identified by this trademark . . .

BRASS • COPPER • ALUMINUM

1SC59

Scovill Manufacturing Company, Mill Products Division, 99 Mill St., Waterbury 20, Conn. Phone PLaza 4-1171.

ALUMINUM FASTENERS

lengthen product life... improve product quality

...and are the fasteners for use with aluminum components

One of the easiest ways to improve your product quality, and increase product life is to fasten all aluminum parts with aluminum fasteners. Fasteners of dissimilar metals can cause corrosion, rust, deterioration and weakened product performance. Coated fasteners are often damaged in the fastening process, and just cannot assure fastener—and product—quality.

Aluminum screws, nuts, washers, bolts, rivets and nails also offer many exclusive benefits with non-aluminum materials—wood, plaster, textiles and plastics, for example. Never rusting to cause stains, aluminum fasteners don't weaken, do provide a *sure, good-looking* fastening. Products and parts stay attractive, and are firmly held. No other fastening metal or material can offer these benefits at aluminum's low cost!

The next time you specify fasteners, consider aluminum. If you have fastener problems or would like further information on aluminum in fastener applications, write to the *Reynolds Metals Company, Box 2346-KL, Richmond 18, Virginia.*

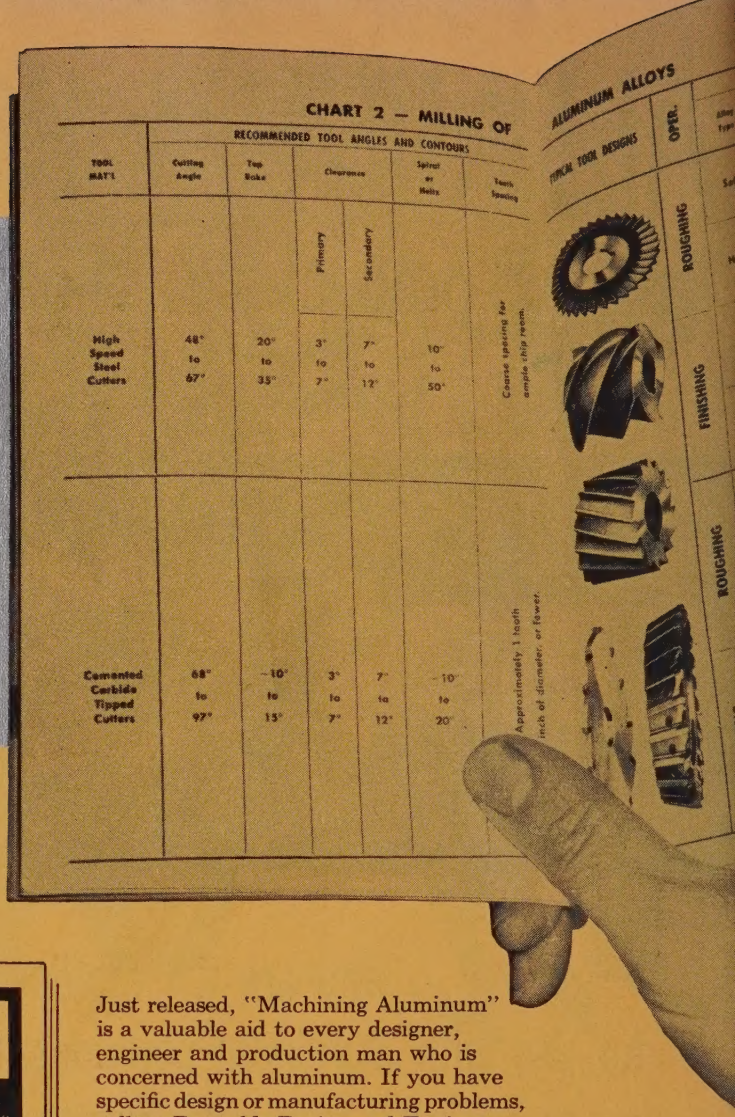
Watch Reynolds Television show—"WALT DISNEY PRESENTS"—every week over ABC-TV

REYNOLDS DOES NOT MAKE ALUMINUM FASTENERS, BUT DOES SUPPLY THE FINEST QUALITY ALUMINUM TO THE FASTENER INDUSTRY . . .

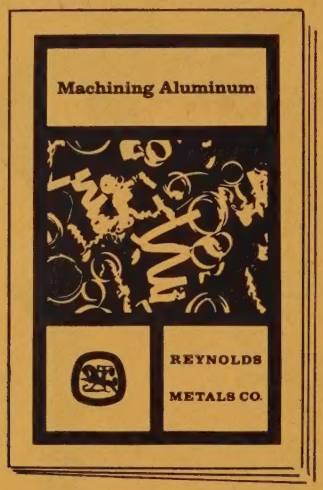
Write today for the names of leading manufacturers.

The Finest Products Made with Aluminum are made with REYNOLDS ALUMINUM

Machining Aluminum for profit!



Write for this free new 32 page REYNOLDS HANDBOOK



Just released, "Machining Aluminum" is a valuable aid to every designer, engineer and production man who is concerned with aluminum. If you have specific design or manufacturing problems, call on Reynolds Design and Engineer Services. In the meantime, make sure you get this valuable addition to your technical library. Subjects covered are:

- Turning Aluminum
- Drilling Aluminum
- Filing Aluminum
- Milling Aluminum
- Reaming Aluminum
- Sawing Aluminum
- General Machining
- Shaping and Planing
- Tapping and Threading
- Grinding Aluminum
- Charts on Tooling, Speeds & Feeds

Reynolds Metals Company
Box 2346-KL, Richmond 18, Virginia

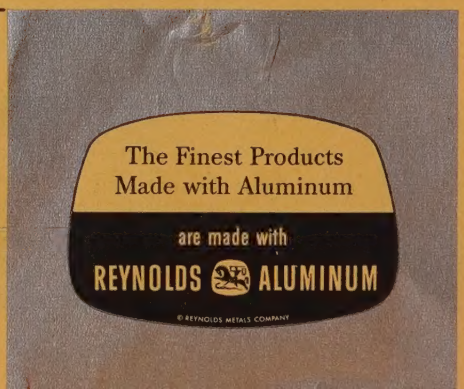
Send me the new Reynolds handbook, "Machining Aluminum"

*Name*_____

*Firm*_____

*Street*_____

*City*_____ *Zone*____ *State*_____



ANOTHER NORTHWEST FIRST!

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- An easy handling liquid.
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- Requires NO special tanks or equipment.
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- Won't injure rack coatings or work finish.
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Alkalume LC-1 is a specially developed immersion-type cleaner for removal of buffing compounds and soil from all metals, prior to plating or anodizing.

It is non-solvent, non-alkaline and not an emulsion. It has the desirable penetrating properties of both alkali and solvent yet affords complete protection for the surface finish.

Alkalume LC-1 is economical, non-toxic and non-volatile, offering long service life and no disposal problem.

Complete details upon request.

The name NORTHWEST means first with the best!

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9310 ROSELAWN DETROIT 4, MICH.

What's New

IN STEEL FROM STOCK

New developments will help give you Increased Value in Buying Metals from Ryerson during 1959. Below are just some of the new additions to Ryerson's comprehensive stocks and services.

NEW FASTER MACHINING TUBING...Ledloy® 170—fastest machining steel tubing ever produced, average speed of 170 s.f.m. And only Ryerson has it for shipment from stock. Users report increases of 25% in productivity... longer tool life...improved finish. Sizes available to date from 1" to 2½" O.D. with maximum ⅜" wall thickness.

NOW EVEN FASTER MACHINING LEDLOY BARS...new Ledloy 375 bars boost machinability to record averages of 375 s.f.m. Large stocks of this new steel supplement Ryerson stocks of regular Ledloy 300 free-machining steels to give you widest selection. Available from Ryerson stocks in rounds from ¼" to 1", hexes from ¼" to ⅝".

TWO NEW PLANTS IN TEXAS...the former plants of Vinson Steel and Aluminum Co. in Dallas and Houston are now a part of the Ryerson organization. These plants, already well stocked and equipped, are now backed up by the unequaled facilities of the 18 other Ryerson plants across the nation. This means Texas metal users can now draw on stocks of more than 12,000 kinds, shapes and sizes of steel and aluminum. Also available, full line of industrial plastics and metalworking machinery.

NEW ALUMINUM STOCKS...are being added in Ryerson plants at Cleveland, Philadelphia and Los Angeles. Aluminum stocks at other Ryerson plants have also been greatly expanded.

NEW STOCKS OF T-1 ALLOY PLATES...in two types: to 321 minimum BNH and to firebox quality specs. "321" gives maximum resistance to impact and abrasion. Five sizes available from 3/16" through ⅝". "Firebox" is for applications requiring high strength and toughness...meets ASME code case 1204-3 for pressure vessels. Available in nine sizes from ¼" through 2". Both types offer good weldability.

STAINLESS EXTRUDED ANGLES...now available from Ryerson. They offer better surface and resultant lower polishing costs...cross-section tolerances less than half those of rolled angles for better forming into rings...no increase in price over rolled angles.

INCREASED VALUE IN STAINLESS FROM RYERSON...even though your application may not demand it in every case, you get the ultimate in specification controls when you order stainless from Ryerson—an important increased value without increased cost. Examples: in addition to chemistry specs for Types 304 and 316, you get the added value of controlled mechanical properties and Brinell hardness—and corrosion resistance assured by actual test.

STAINLESS HEADS—NATION'S LARGEST STOCK BY FAR...Ryerson stocks now include every requirement for ASME flanged and dished heads in Types 304, 304L, 316 and 316L in a wide range of gauges and sizes.

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RYERSON STEEL®

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NATION'S MOST COMPLETE SERVICE ON STEEL... ALUMINUM... PLASTICS... METALWORKING MACHINERY

SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

MODERN METALS

Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

ON THE COVER: To grasp the full significance of the machinery prettily pictured on the cover, you'll have to read the article beginning on page 30. It's the world's first commercially successful continuous sheet casting process. Shown beside the coiler is Joe Hunter, inventor of the process and president of Hunter Engineering Co. The installation produces high quality coiled ¼-inch thick aluminum reroll stock up to 38 inches wide. The machine is run by one man and its capital cost is a fraction of that of the usual hot line. Other Hunter inventions, including a continuous extrusion billet casting machine and a cold extrusion process, will be detailed in later issues.

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Modern Metals

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Molten aluminum is cast directly into quarter-inch thick reroll sheet by the unique sheet casting process developed by Hunter Engineering Co. Cast and coiled product is ready to be cold rolled to high quality sheet or foil.

HANDLING TITANIUM SPONGE **38**
It's fast, safe and economical at Mallory-Sharon. Reason: Aluminum Tote Bins are used.

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Integrated LOMATIC line straightens, cold draws, cuts, polishes ⅝-inch round rod at a rate of 3500 pounds per hour. High speed unit handles other shapes, sizes.

AFRICA'S BOOMING ALUMINUM INDUSTRY **68**
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CUTTING COSTS WITH DIE CASTINGS **72**
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NEW FACE FOR NORAL PLANT **84**
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MAGNESIUM IN AIRBORNE PHOTO GEAR ..... M. J. Mraz & C. Ellman **86**
With increasing size, range and complexity of aerial reconnaissance equipment placing heavy priority on weight trimming, magnesium is now a star performer.

BIGGEST INDUCTION EQUIPMENT MAKER **90**
Magnethermic to buy assets of two Ajax companies. Result: First integrated manufacturer of induction furnaces for heat treating and melting metals.

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doesn't worry
about competition

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LI 8-4811

Letters

AF ACADEMY TABLES WERE MADE BY . . .

Sirs:

In your December 1958 issue, your article on aluminum in the United States Air Force Academy contained pictures of the tables now being used in the Academy. Under these pictures on Page 38 you gave credit for the manufacture of the tables to Blair Aluminum Company.

I would like to call your attention to the fact that the tables were manufactured by Huntington Furniture Corp. and the aluminum for these tables was supplied by Ravens Metal Products, Inc.

"M"—W. Va.

MM—Shucks! You nailed us on this one. The caption on page 38 of the article should have named Huntington Furniture Corp. as the manufacturer of the lounge tables and corridor benches. Ravens-Metal Products Co., the subcontractor handling the aluminum fabricating for Huntington, referred sometimes to Huntington Furniture Corp., sometimes to Huntington Chair Corp., in our correspondence.

WHO SUPPLIES IMPACT EXTRUSIONS?

Sirs:

We are interested in contacting a reliable source for impact extrusions in the Midwest area. We have several items we propose marketing that require this process.

It is our understanding that there are a limited number of impact extruders, so if you can advise us where we may obtain this list, it will be appreciated.

Thank you for your cooperation.

"R"—Iowa

MM—Here's a partial list of impact extrusion suppliers:

Aluminum Co. of America
877 Alcoa Building
Pittsburgh 19, Pa.
Bridgeport Brass Co.
30 Grand St.
Bridgeport 2, Conn.
Harvey Aluminum
Torrance, Calif.
Magnesium Co. of America
East Chicago, Ind.
National Impacted Metal Corp.
P. O. Box 151
New Albany, Miss.
White Metal Rolling & Stamping
82 Moultrie St.
Brooklyn 22, N. Y.

Any others wanna contact this manufacturer of housewares and specialties?

ANOTHER PREFABBER REPORTS

Sirs:

This is a belated reply to your letter asking our opinions on the "Viking" aluminum houses introduced by National Homes (MM, Jan. '59). Our answers to your questions are as follows:

1. We think National's new line will touch off a trend to a greater use of aluminum for prefabricated home builders as well as all builders, but it is too early to say how many will go to the same extent in the immediate future.

2. We think custom builders will follow suit gradually, based on individual home buyers' requests.

3. Our houses currently use a small per-

For prompt quotations on

LARGE DIAMETER

Equipped to handle 122" diameter blanks

SPUN PARTS

Many STANDARD tools available for Fan, Blower and Roof Vent parts.

Write - Wire - Call

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46 Fluhart Blvd. Dayton 8, Ohio

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From ½" to 42" wide
All finishes

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requires position . . .

12 years' practical experience in die design, manufacture and repair, press production and fabricating experience. Will locate anywhere.

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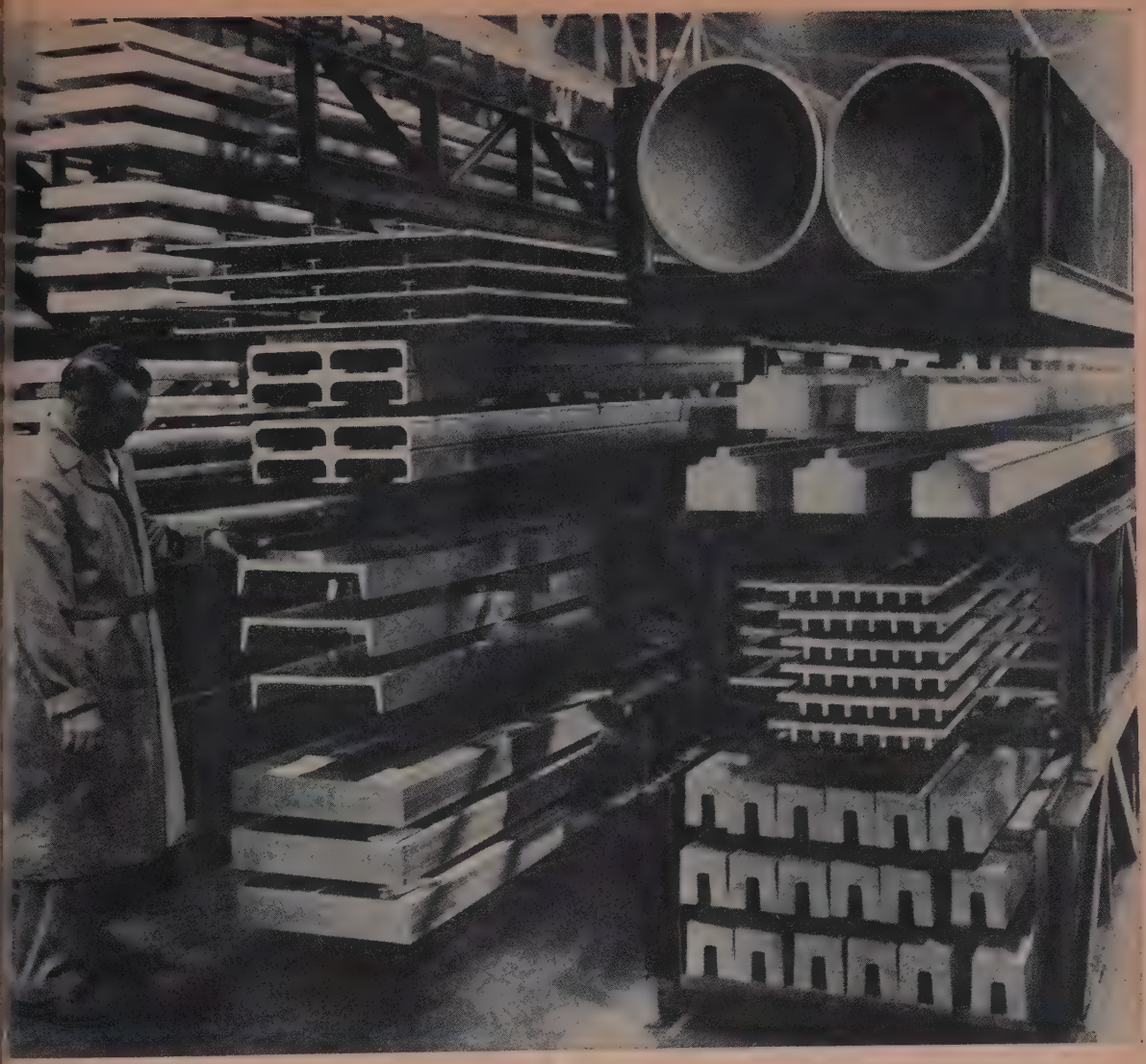

BIG EXTRUSIONS

...from Harvey Aluminum

mprove design

educe weight

ower assembly costs

BIG QUALITY EXTRUSIONS — 3 feet wide and wider, as long as 80 feet — are being made by Harvey Aluminum. For information on BIG aluminum extrusions, and smaller shapes, too, write direct to Harvey Aluminum, Torrance, Calif., or contact the nearest Harvey Aluminum factory branch listed under "Aluminum" in your classified directory.

A major independent producer of quality aluminum in all alloys and sizes: Pig, ingot, billet, rod and bar, pipe, tube, hollow sections, press forgings, forging stock, hand forgings, impact extrusions, electrical bus bar, structurals, special shapes, light and heavy press extrusions, screw machine and other aluminum products. Similar products in titanium, zirconium, and steel. HARVEY ALUMINUM SALES, INC., Torrance, California.

HARVEY Aluminum

Send for this helpful booklet covering properties and uses of Whitelight Magnesium . .

Whitelight
MAGNESIUM

your comprehensive independent mill source of magnesium alloy . . .

ALLOYS
AZ10
AZ31
AZ51
AZ61
AZ81
ZK60
ZK30
M-1
ZK-20
Anodes

RODS — ⅛" dia. to 6½" dia.
BARS, STRIPS — .022" min. to 7¾" max.
SOLID SHAPES — .022" min. to 6½" circle
TUBING — ¼" O.D. to 6" O.D.
HOLLOW SHAPES — ¼" to 6½" circle
PLATE and SHEET—.092" to 3" thick (36" and less)

WHITELIGHT MAGNESIUM

Your inquiry will receive our prompt attention.

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Factories: Brooklyn, N.Y., Warsaw, Ind.

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Midwestern Aluminum Extrusion plant needs Die Repair Superintendent. Excellent opportunity for ambitious man with technical skill and supervisory experience in extrusion die repair work.

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Now reducing brass slabs .400 thick down to ⅛".

"priced for a quick sale"

Wire - Write - Phone

ARNOLD HUGHES COMPANY
2765 Penobscot Bldg., Detroit 26

centage of aluminum for special nails, window and door screens, and screening for vented soffits and louvers. For special projects we use various glass door units.

4. We have explored aluminum along with other materials, but to date have found the wood items more competitive and more saleable. We may use, where called for, aluminum siding and possibly more aluminum windows as standard.

5. We guess that by 1964, through improved codes, marketing, products, and services, the prefabrication industry as known today could supply up to 40% of the total residential housing output.

"T"—Pennsylvania

MM—This letter is a reply to a questionnaire we sent to prefabricated home manufacturers prior to preparing our "Light Metals Man of the Year" article on Jim Price of National Homes. This reply arrived too late for inclusion in the article. For other prefabbers' comments, see the article in our January issue.

WHO MAKES ALUMINUM HOMES?

Sirs:

For the past 12 years we have been an established sales organization selling various types of building products.

We are now interested in contacting a manufacturer of contemporary designed aluminum houses and industrial buildings. Anything you can do to assist in this search will be appreciated.

"R"—New York

MM—We suggest that you contact the National Home Manufacturers Association, 117 Barr Building, Washington 6, D. C.

WHO MAKES PONTOONS?

Sirs:

Best regards to you and your wonderful magazine.

I have a question, to wit: Do you know of any manufacturers of aluminum pontoon floats used to support houseboats, etc. in water? One of our customers is very interested in finding a source for same.

"P"—Minnesota

MM—Sorry, we don't. But somebody better start making something like this out of aluminum, because the metal is rapidly losing ground to plastics in the small boat field. We plan to publish a report on this soon. Meanwhile, can anybody help this reader?

WANTS TO COAT STEEL WITH ALUMINUM

Sirs:

We are writing to you in our attempt to obtain information regarding the coating or surface-alloying of steel, such as automotive exhaust tubing, with aluminum, in order to increase resistance to corrosion or oxidation.

Since it is well known that Armco has a virtual monopoly in aluminized strip steel, and since they are behind in making deliveries of this type of coated steel strip, we are studying the possibility of dipping the fabricated tubular part in a molten bath of aluminum, but with previous preparatory treatment.

Thank you for any information you can offer.

"J"—Michigan

MM—A ticklish subject for us. Such processes might tend to reduce aluminum consumption in certain applications. But we've sent you tear sheets (our last set) of our June 1954 article on General Motors' patented "Aldip" process.

Why not
ROLL YOUR OWN

MICHIGAN ROLL FORM

If your business requires **shapes-by-th mile** you may very likely find it more co venient and economical to **roll your ow** MICHIGAN ROLL FORM equipment: fo rolls, rolling machines, notching dies, c off machines and dies . . . add up to g you an **all-in-one** automatic, productio line operation. For full particulars, addr your inquiry to the Engineering Dept.

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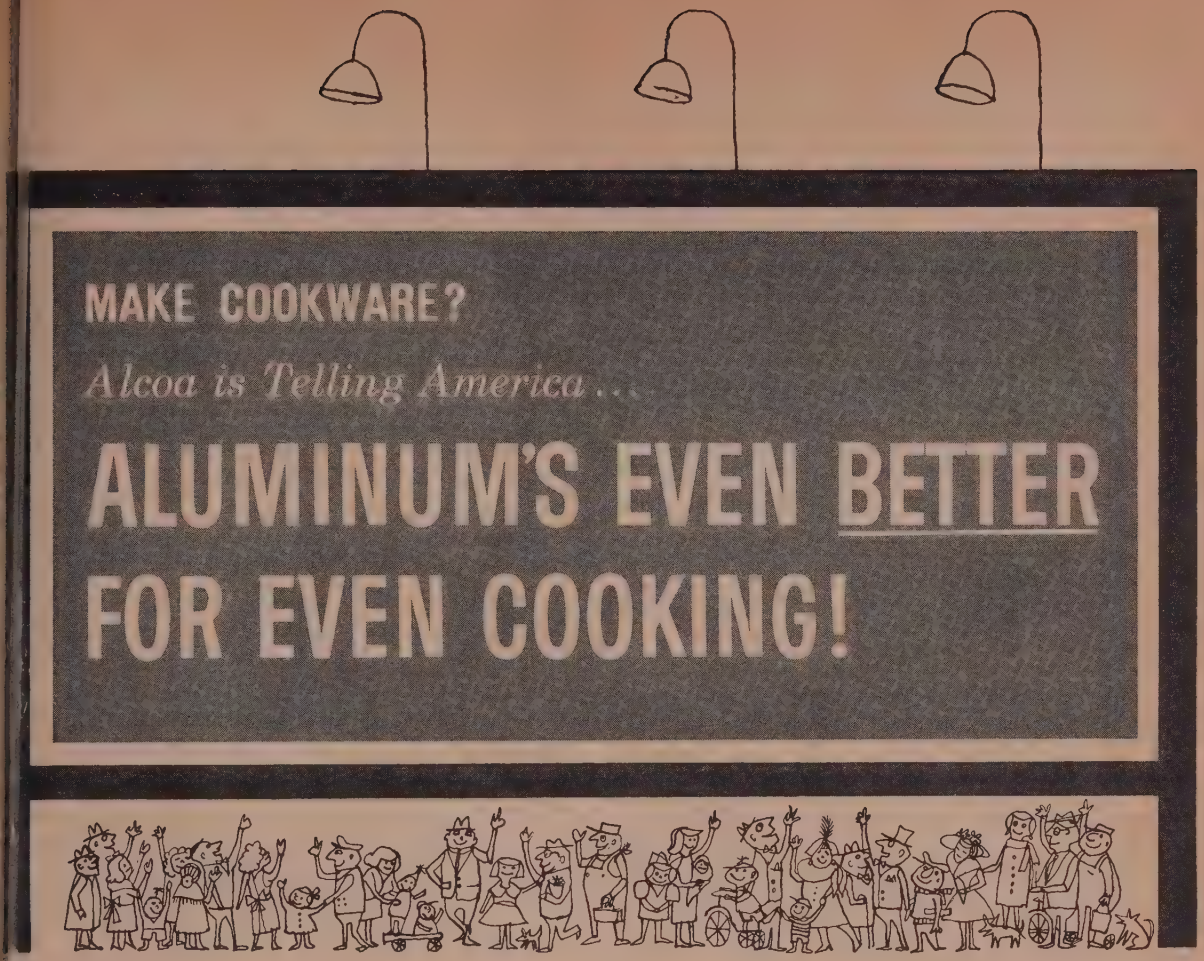

***Another Alcoa Market-Maker Promotion—March and April**

illions will see it . . . millions more will hear it . . . lcoa's nationwide message to the homemakers of merica: "Aluminum's Even *Better* for Even Cooking!"

n Alcoa Theatre (NBC-TV Network, alternate Mondays, 9:30 p.m., EST) . . . four hard-hitting commercials, oing home to 18,800,000 viewers with aluminum's ven-heating, even-cooking story.

n Alcoa Presents (ABC-TV Network, every Tuesday, 0:00 p.m., EST) . . . seven more cookware commercials, resented on one of the nation's newest, most dramatic levision series to a skyrocketing audience of more than 7,000,000.

n Network Radio . . . reaching an estimated 3,000,000 steners with multiple sales messages on aluminum ookware.

MARKET-MAKER symbolizes Aluminum Company of merica's year-round sales-imulating programs for manuacturers and retailers of aluminum products. Watch for ther "Market-Maker" promotions of FURNITURE • HARDWARE • GIFTWARES BOATS, MOTORS AND CCESSORIES • SPORTING OODS • MAJOR APPLINCES • RESIDENTIAL UILDING PRODUCTS

Make it pay! Tie in with Alcoa's sales-making theme, "ALUMINUM'S EVEN *BETTER* FOR EVEN COOKING!" . . . feature it in your own advertising and promotions.

8 OUT OF 10 BUYERS
KNOW THIS LABEL...
IT'S THE BRAND BEHIND
THE BRANDS THEY BUY

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

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1600-C Alcoa Building, Pittsburgh 19, Pa.

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ALUMINUM

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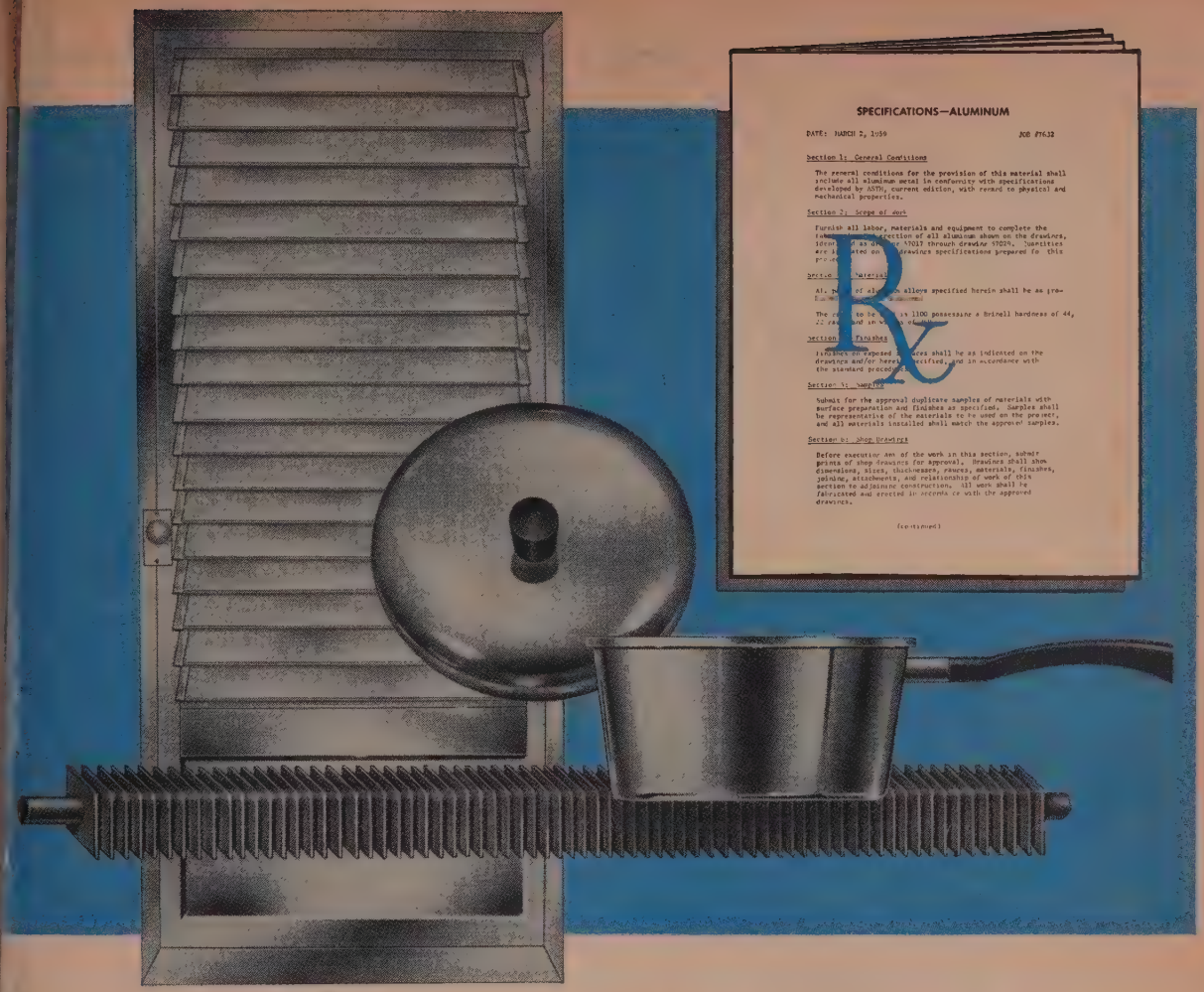
Here and There

Who Is Timgal? What Is He? » » In April '58 a caricatured extrusion die-maker by the mysterious name of Timgal made his debut in the advertising pages of Modern Metals. Month after month, with the kind of regularity we enjoy most about our ad friends, Timgal livened up our columns with his homespun doggerel. Extruders began to gather in puzzled groups . . . "What's with this Timgal guy?" The Extrusion Die & Tool Co. of Warren, Mich., Joe Doss's up-and-coming new outfit, kept 'em guessing until December when he offered a free die service to the first extruder to figure out correctly just what Timgal stood for. Roy A. Moody, Panduit Corp., Midlothian, Ill., was the winner. The contest was repeated in our February '59 issue. Winner of the second heat: M. M. Miller, The Dow Chemical Co., Madison, Ill. And Timgal—what does it stand for? The chemical terms for titanium, magnesium and aluminum. Simple, what?

Growing, Growing » » Aluminum's rapid development as a construction material in "every type of industry" is shown by the most recent survey of *Aluminium News*, external organ of Aluminium Limited. The estimate that per capita consumption per year has risen appreciably—even in the less developed nations of the world. U. S. consumption is now estimated to be 22.3 pounds; Switzerland, 16.1; United Kingdom, 12.9; Canada, 11.5; West Germany, 11.1; Norway, 9.8; Australia, 6.0. Even countries like Mexico, Argentina, Spain and India show increasing use of the light metal. "Final uses of aluminum vary greatly from one country to another," the magazine reports, "but in all of them aluminum, once the metal only of pots and pans, now is used in every type of industry." Of the low consumption countries we'd say the Union of South Africa (1.1 lbs.) has the best chance of a rapid increase; turn to page 68 for the reason.

Design Evolution in Missiles » » Some significant structural trends are taking place in the field of spacecraft design, according to Dr. George Gerard, New York University engineering expert. He points to the growth of tension structures employing extremely thin-walled, pressure stabilized shells. In present aircraft and aerodynamic missiles, an average of one-third of the airframe structural weight is governed by tension considerations, while compression and shear buckling are the prime factors in the design of the balance. But in ballistic missiles about one-half of the weight is governed by tension and the other half by buckling considerations because a large part of the structure resembles pressure vessels. Result is that the use of sheet materials will grow, with a corresponding diminution in the need for forgings and extrusions. The growth factor (the rate at which takeoff weight changes as a result of a marginal variation in total weight) for ballistic missiles, Gerard says, is about 10 times that for manned aircraft and nullifies the advantage of the missile's reduced airframe weight-to-gross-weight ratio. In space vehicles the growth factor looms large. For an interplanetary missile requiring a four-stage chemical


SPECIFICATIONS—ALUMINUM
DATE: MARCH 2, 1959
JOB #7632
Section 1: General Conditions
The general conditions for the provision of this material shall include all aluminum metal in conformity with specifications developed by ASTM, current edition, with regard to physical and mechanical properties.
Section 2: Scope of Work
Furnish all labor, materials and equipment to complete the fabrication of all aluminum shown on the drawings, listed as drawings 57017 through drawing 57029. Quantities are indicated on the drawings specifications prepared for this
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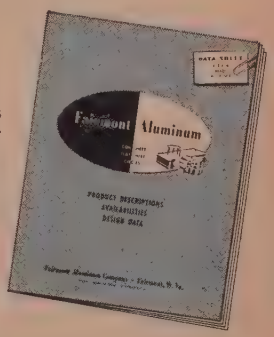

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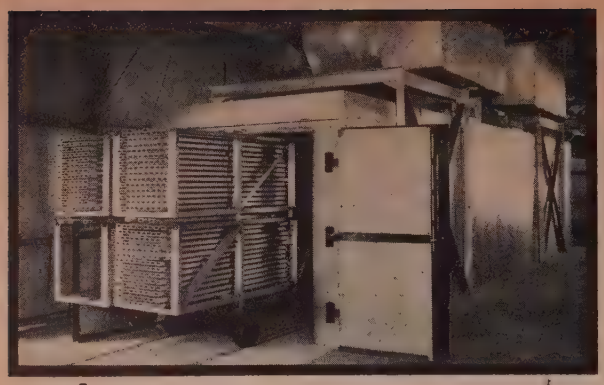

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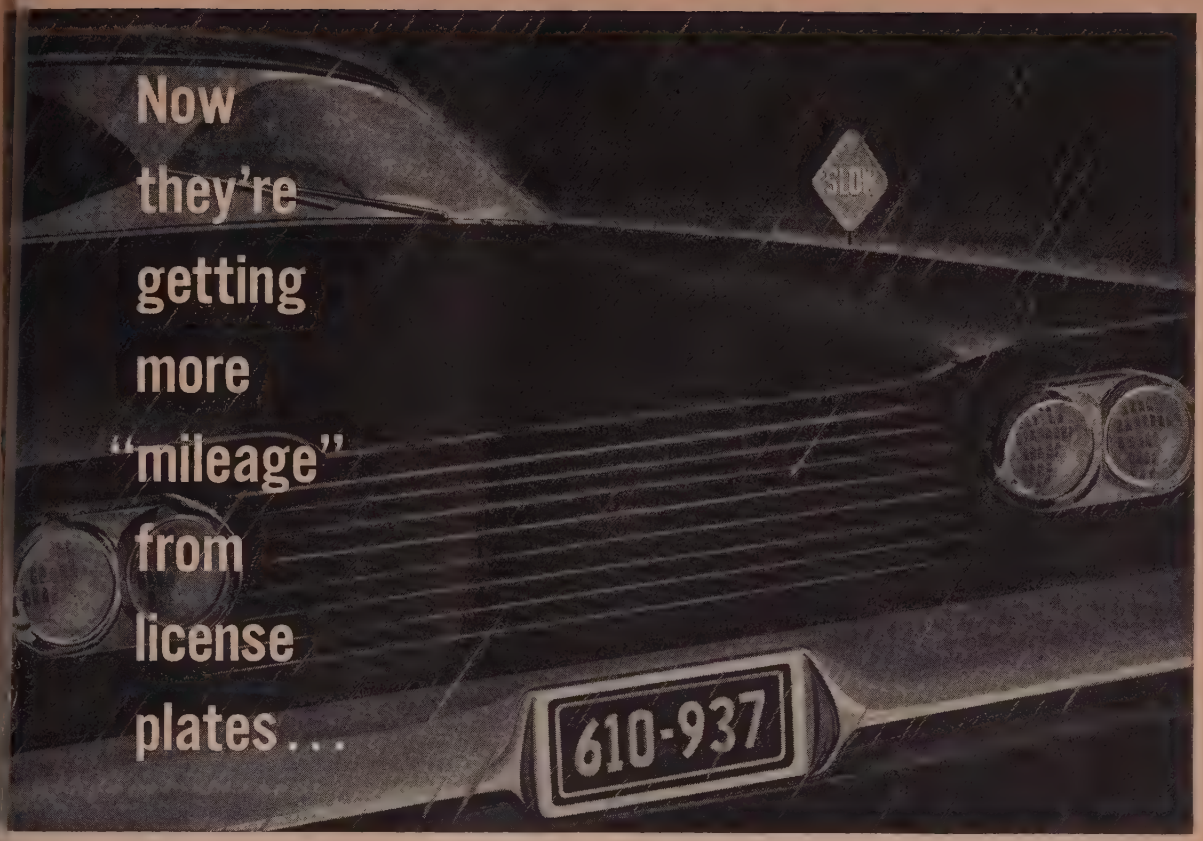
rocket, the growth factor zooms to 44,000. It would, according to M.I.T.'s Dr. Paul E. Sandorff, make the use of a solid platinum ($2000 a pound) fourth stage economical indeed if only an ounce of weight was saved for every pound of the precious metal used.

Cheaper Than Platinum, Though » » All of which points up beryllium's growing potential as a missile construction material. It's far out of the bar gain basement class, particularly at this early stage of its development, but it's bound to become increasingly important as the years go by. It's extremely light. This property, combined with those of high strength to weight and resistance to very high temperatures, explain why the Air Force is broadening its experimental program for beryllium.

Picture of a Tough Job » » A refractories expert for H. K. Porter Co. put a capable finger on a major task of the secondary aluminum industry when he said that it "has all the problems of the primary industry magnified by the complexity of the charge components and the logistics inherent in keeping the many raw materials physically separated." Speaking at an A.I.M.E. convention last month, Wilfred H. Stewart said, "The aspect of secondary production that immediately is noted by those familiar with metallurgical practice . . . is the very large number of raw material types that must be processed through even one heat and whose identity in storage must be reasonably maintained." Stewart's description of the aluminum melter's stock-in-trade verged on the eloquent: "The range of material will run from clean mill scrap, or clip from prime operations through old pots and pans, dirty castings, used pistons with struts, and so forth, and drosses of very low metallic content," he said. "This very great range which includes prime ingot and prime alloy poses one of the most difficult problems in handling that can be imagined. The storage problem as well as the processing before scrap is almost a separate industry within an industry."

Research Spreads the Wealth » » The rewards of unstinting, endless product research and development by the primary aluminum producers have been the rapid growth of the aluminum fabricating industry from a "handful" of firms to "an estimated" 25,000 today, according to F. J. Close, Alcoa's vice president in charge of sales development and industry sales. This policy of continuing research is the biggest single factor in Alcoa's penetration of markets long held by other materials, he said. Major examples of the impetus given by research to the growing aluminum industry are the commercial and residential building fields; Close said that the largest single tonnage application in this field since World War II has been the aluminum window. "Today, more than 300 firms manufacture them," he stated. Nor has the annual bite for research and development leveled off. Alcoa's research allocation for 1959 has been set at another all-time high of $18 million, and a 2000-acre site has been acquired for a campus-type technical center that will cost in excess of $30 million. Truly, as Close said, research is the seedbed of national prosperity in the year ahead.



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Useful Data

Industrial Building Products made from Kaiser al minum are described in a new 12-page booklet. I cluded in the industrial building product line a three types of ribbed siding, V-beam roofing and si ing, corrugated roofing and siding, flashing and a cessories. The products are used in conventional ro ing and siding applications on industrial type stru tures and in field-assembled insulated sandwich wall Tables give weight and coverage of the products. Fo the 12-page full-color bulletin write to Kaiser Alum num & Chemical Sales, Inc., 919 N. Michigan Ave Chicago 11.

The Oakite Chromicoat Process for Aluminum the subject of a folder issued by Oakite Products, In The folder describes in detail this conversion coatin for aluminum which inhibits corrosion and improv paint adhesion. Step by step application of chromico in spray washing machines or in tanks is describe Copies of the folder will be provided by Edward Ca son, Oakite Products, Inc., 45B Rector St., New York

"A Practical Guide to Investment Casting," 44-page is being offered by Arwood Precision Casting Cor to provide information on how companies can us investment castings to advantage. Typical investmen castings are pictured. Specifications of standard ca alloys including those of aluminum and magnesiu are given in chart form. A special section gives a ge eral guide to casting design, tolerances and desig limits, as well as Arwood facilities for customer servic tooling, production, inspection and testing, heat trea ing and finishing. Address inquiries for the guide t W. O. Sweeney, Arwood Precision Casting Corp., 32 W. 44th St., New York 36.

Facilities and manpower at sheet Aluminum Corp subsidiary of Mueller Brass Co., are the subject of new 4-page folder. Typical process for handling a order for aluminum sheet, coil and strip products given a step-by-step description including photograph of various phases of operation: annealing, slitting an shearing. The company offers "custom rolling servic at standard production costs." For a copy write C. I Pursell, Sheet Aluminum Corp., Subsidiary of Muelle Brass Co., 701 Liberty St., Jackson, Mich.

Titanium, in all its forms and alloys, is the subje of a 36-page bulletin put out by the Titanium Divisio of Harvey Aluminum. The introduction gives the stor of the early development of the titanium industry. Th subsequent section on manufacture of titanium d scribes step by step the reduction and melting processe and includes paragraphs dealing with fabricatio metallurgy, research and development. The section o advantages of titanium lists its physical and chemic properties comparing them with steel and aluminum Corrosion properties of titanium are detailed in a ful page chart. Alloys produced by Harvey for the goverr ment are specified as are various titanium mill product A multiplicity of tables give weights and tolerances i

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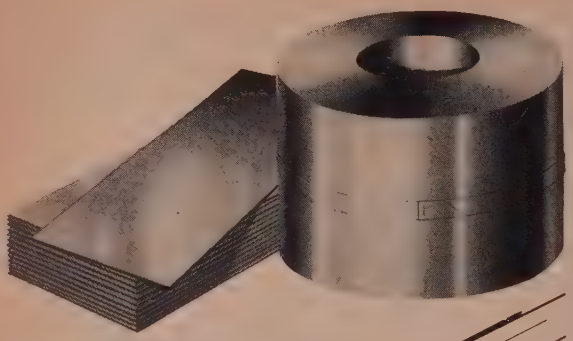

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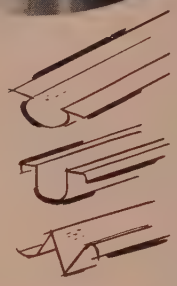

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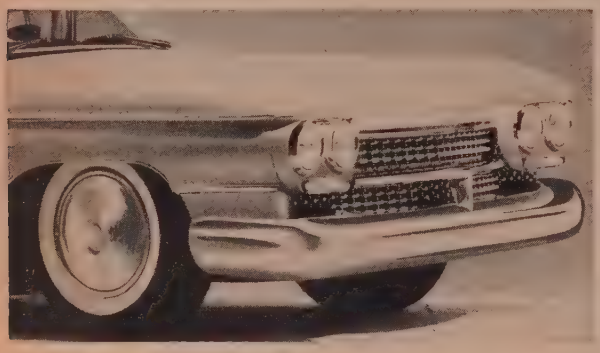

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handy reference form. There are sections on machining and joining and titanium applications. Address inquiries to Gene Alfred, Harvey Aluminum, 19200 South Western Ave., Torrance, Calif.

"Lo-Air," a new cold work alloy tool and die steel, is introduced by its manufacturer, Universal-Cyclops Steel Corp., in a 12-page color booklet. Charted and described are machinability, fatigue properties, general heat treatment, response to heat treatment and stock sizes of the low temperature—air hardening tool and die steel. The booklet suggests uses, illustrates equipment used to produce and test the steel. Write for Bulletin TS-101 to N. W. Calkins, Universal-Cyclops Steel Corp., Bridgeville, Pa.

Aluminum Mill Products produced by Kaiser Aluminum & Chemical Corp. are completely listed and described in a new 24-page booklet. It gives information, largely in tabular form, about mill products including various types of sheet, plate, foil, rod, bar, wire, extrusions, tubing, forgings, billet and pig. Other products described are roofing and siding, Shadescreen, process pipe, mining and construction pipe, irrigation tubing, portable cords, bus conductor, building wire, machine tool wire and welding cable. Copies will be furnished by Dept. NR-19, Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Ave., Chicago 11.

"The Evolution of a Modern Cutting Fluid," a 4-page folder of E. F. Houghton & Co., traces the development of coolants from water to oil to fortified petroleum base, then to heavy-duty water-soluable concentrates, and now to chemically conceived coolants containing no petroleum. The company's new product, Hocut 237 is featured in the booklet. Copies may be received by addressing D. C. Miner at E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

"Ultrasonic inspection with the reflectoscope" is defined in an 8-page bulletin by Sperry Products, Inc. In this method for the non-destructive detection and location of defects in materials an electrical pulse generated by the instrument is transformed into mechanical vibrations which pass through the material and are reflected back to be changed into amplified, visible electrical pulses. Methods of search include straight beam, angle beam, surface wave and immersion type. The bulletin gives examples of ultrasonic inspection of raw materials and finished products, in preventive maintenance and production. Various types of Sperry machines are shown. Another folder describes Sperry testing services for companies whose requirements do not warrant purchase of ultrasonic equipment. Write to Edward Castro, Sperry Products, Inc., Danbury, Conn.

Electric and fuel fired heat treating furnaces and protective atmosphere generators manufactured by Hevi-Duty Electric Co., are catalogued in the company's bulletin No. 653A. General headings of the booklet, which contains 45 illustrations of specific equipment, are vertical retort and pit-type furnaces, box-type electric and fuel-fired, continuous, pot-type electric vacuum and fuel-fired hydrogen atmosphere, high-temperature electric furnaces, and gas generators. One page is de-

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voted to illustrating Hevi-Duty's laboratory and metal processing equipment. Write to R. A. Cook, Hevi-Duty Electric Co., Milwaukee 1, Wisc.

A new machine for automatic small parts die-casting is illustrated in a folder by British Machines and Foundry Supplies, Ltd. The DCMT ram automatic diecasting machine with no operator averages 1500 shots per hour, according to the folder. Described are the automatic cycle, platen arrangement and various features of the machine including flash sensing "Di-Saver" safety system, separate electronic portable control unit, automatic die temperature control, automatic die cleaning and self-lubricating mechanism, automatic ladling and removable die unit. Write to A. Gassman, British Machines and Foundry Supplies Ltd., 80 Shore Road, Port Washington, N. Y.

Metal Cutting Band Saws are described in Catalog No. G-56B by Wells Mfg. Corp. Five models of saws are pictured; two models of bar feeds are shown; accessories are described. The 8-page brochure is available from R. W. Bowers at Wells Mfg. Corp. 430 Service Rd., Three Rivers, Mich.

"Filler Metals for Joining," by Orville T. Barnett of Illinois Institute of Technology has been recently published by the American Welding Society. The book is designed as a reference for all concerned with welding, brazing, and soldering. It summarizes the industrial practices in the selection of filler metals for any metal joining problem. Special emphasis is placed on products for manual and automatic arc welding. One chapter is devoted to aluminum and aluminum alloys. Cost of the 250-page book is $7.00 from L. Van Treese, Reinhold Publishing, 430 Park Ave., New York 22.

The new "Platecoil" technical data manual is a complete revision of the former "Platecoil" technical data manual of Tranter Mfg. Inc. The 49-page compilation includes specifications and data essential to proper engineering and installation of the new Multi-Zone "Platecoil." There is a complete description of styles in the new heat transfer unit line with dimensional data for each. Methods of calculating heat transfer equipment requirements are outlined along with basic information such as physical properties of materials. Address requests to Tranter Mfg. Inc., "Platecoil" Division, Lansing 9, Mich.

Alloys and forms of aluminum available from Reynolds Metals Co. are the subject of a new aluminum mill products brochure issued by Reynolds. Purpose of the publication is "to enable designers, engineers and buyers to pinpoint specific properties and apply them accurately to the desired end use." The 18 pages include alloy and temper designations, fatigue and shearing strengths, and various alloys produced in foil, sheet and plate, wire, rod and bar, tubing and pipe, and extruded and structural shapes. Most of the information is in tabular form. Fabricating and finishing techniques are summarized: and a bibliography lists related literature and movies provided by Reynolds. Write to Reynolds Metals, Dept. PRD-1, Box 2346, Richmond, Va.

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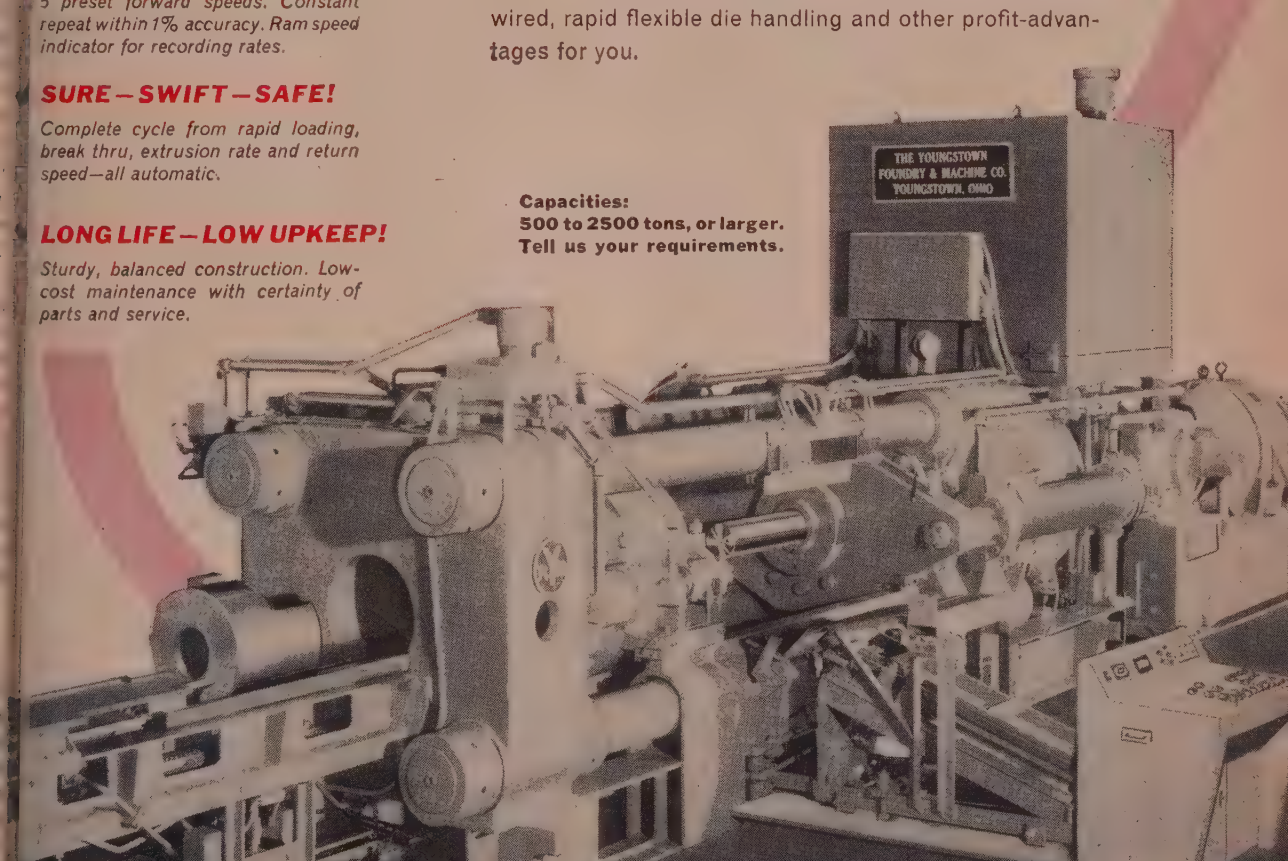

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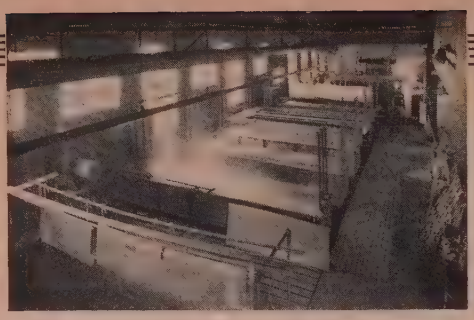

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The use of aluminum "broke" boxes by Mohawk Paper Mills, Inc., Cohoes, N.Y., has meant the end of wood splinters in paper trimmings, known as "broke." A few splinters from wooden boxes formerly used to haul the broke, which is reused, could ruin a new batch of paper.

A new refrigerated, rear engined **delivery truck,** manufactured by Clark Industries, 375 East Fifth Ave., Columbus, Ohio, has an aluminum inner and outer shell. Rear engine drive makes truck lower to the ground by eliminating the drive shaft. Clark estimates the new design will reduce delivery costs by some 25%.

A polaroid spotting **camera** developed for aerial reconnaissance photography by Mast Development Co., Inc., 2212 E. 12th St., Davenport, Iowa, develops 3 in. x 4 in. opaque positives in 60 seconds. The camera is aluminum and weighs eight pounds.

Spark proof, corrosion resistant "Rol-Lock" **aluminum grating** is made by Kerrigan Iron Works, 1033 Harman St., Nashville 8, Tenn. Five load bar heights range from one to two inches. When used as package slide, packages can slide along the smooth side of the grating. Panels range from 2 to 9 ft. in length. Load rating, based on concentrated capacity in pounds per foot of width, is 633 to 49 lb. for the 1-in. size; 2,984 to 460 lb. for the 2-in. size.

New **paint spray gun** for automatic machine service, made by Paasche Airbrush Co., 1909 W. Diversey Parkway, Chicago 14, features a dual air valve for adjustment of spray. The valve controls air-inlet at a ¼ in. pipe thread and paint inlet at a ⅜ in. pipe thread. The body is an aluminum die casting with a brass cylinder liner.

A self-priming centrifugal **pump** is made of aluminum in its two smallest sizes to provide portability and corrosion resistance. Manufacturer is Worthington Corp., 423 Worthington Ave., Harrison, N. J. Sizes are 1½ in. to 8 in., suction and discharge. Internal wearing parts are iron and steel.

A **vinyl-to-aluminum laminate** that can be deep drawn, bent, punched, roll-formed, or crimped with standard production techniques is being produced in sheets to 32 in. by 144 in. and coils up to 32 in. wide in all popular gauges and tempers and a wide range of vinyl color by American Nickeloid Co., Peru, Ill.

All-aluminum **shower cabinets** are made by Vogt Brothers Mfg. Co., P. O. Box 922, Louisville 1, Ky. They are prefabricated from sheet. Size is 32 in. by 32 in. by 76 in.

The "Insul Chest," a rectangular **freezer-chest,** with a handle for portability will be an aid to picnickers this summer. Lovell Mfg. Co., Erie, Pa., makes the freezer-

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A 52-lb. aluminum **truck cover,** when installed by three bolts on each side to the side walls of a pick-up truck, affords protection from weather. The "Sports Lines" made by Aeromotive Metal Products, Inc., 811 Edmunds St., Seattle, Wash., has either fixed or ventilating side windows and a rear door with car-type locking handle as optional accessories.

"Silver'n'Spice" is the trade name for **furniture** made by combining a new "cinnamon" finish wood with aluminum. Manufacturer of the 18-piece, stackable line of contemporary furniture is Ogden Mfg. Co., 1436 South 22nd, Louisville 10, Ky.

Pushbutton **thermostat** is made with an aluminum hinged cover by White-Rodgers Co., 1209 Cass Ave., St. Louis 6, Mo. Positive-set action on pushbuttons prevents children from disturbing heating mechanism. The unit is attachable to different types of heating systems.

All parts of an overhead **traveling crane** except for movings parts such as gears and wheels are made of aluminum. Parts are welded in construction. Girders for a 12-ton 52 ft. crane weigh 5 tons. Northern Engineering Works, 210 Chene St., Detroit 7, Mich., is the manufacturer.

Foundation ventilators made of die-cast aluminum alloys by Louver Mfg. & Supply Co., 3603 Wooddale Ave., Minneapolis, Minn., are stronger than conventional sand-cast scrap aluminum units according to Louver. The company makes four models in one standard 8 in. by 16 in. size with and without screen backing, or with galvanized metal shutter.

A **machine that bundles bars** into packages from 100 lbs. to 700 lbs. has been developed by Schloemann Aktiengesellschaft, Steinstrasse 13, Dusseldorf, Germany. The material to be bundled is entered between two arms, which carry the tying wire. The machine then bundles the bars, twists the wire, and cuts off the finished bundle, in quick succession.

A baseboard **electric heating system** made by Spartan Electric Radiator Corp., 52-55 74th St., Maspeth 78, N. Y., employs 20 sq. ft. of aluminum fins per 4-ft. section as heating elements. System is offered in units of 4-, 6-, and 8-ft. sections, rated at 1000, 1500 and 2000 watts.

The so-called "Paul Bunyan Box" is a new **container** for air shipments designed in aluminum to American Airlines' specifications by Aerobilt Bodies, Inc., Athens, N. Y., a subsidiary of Grumman Aircraft Engineering Corp. The Bunyan Box is capable of holding over a ton of cargo. It is 63 in. high by 42 in. deep. Aluminum construction makes possible high volume-to-weight ratio and assures good protection of cargo.

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and drawings has been developed in aluminum by Plan-Hold Corp., 5204 Chakemco St., South Gate, Calif. A wing nut opens the ball and socket clamp for removal of plans. Aluminum parts are satin-finished and have rounded edges.

Cast aluminum unit houses a new **photoelectric control** made by Autotron Co., Box 722-C, Danville, Ill. Overall dimensions are about 7¼ in. by 6¾ in. by 5 in. Lens diameter is 1½ in. Gasket is sealed and threaded for ½-in. conduit. Actuating light is minimum at 5 foot-candles. Minimum actuating interval is .25 second.

Awnings strong enough to withstand heavy loads of snow yet having no unsightly braces are made by Aluma-Shade Co., Div. The Hydronic Co., 12685 Arnold Ave., Detroit 39, Mich. Aluminum panels interlock to form water-tight, reinforcing joints every 8 inches. Panels hook into standard awning rails and telescoping aluminum support poles. For do-it-yourself attachment to homes, mobile homes, carports, and cottages.

Revolving shelves for the kitchen are made by Hipp Welding, Inc., P. O. Box 28, Palo Alto, Calif., and tradenamed Bassett Revolving Shelves. The unit features adjustable aluminum shelves revolving on ball bearings.

Deep drawn shapes and shells of aluminum and magnesium with capacities of 1 quart to 100 gallons are offered to design engineers by Pressed Steel Tank Co., 1449 S. 66th St., Milwaukee 14, Wis.

A tube axial blower produced by Eastern Air Devices Inc., 385 Central Ave., Dover, N. H., has steel bearings and shaft with an anodized aluminum blade and housing. Weight is 4 ounces. The unit has a 2½-in. mounting flange; delivers 10 cu. ft. per min. at .11 in. static pressure, 15 cfm. at zero static pressure.

Cable trough is made in aluminum as well as steel. The unit, product of T. J. Cope Division, Rome Cable Corp., Third & Walnut St., Collegeville, Pa., is made with solid sides. Sections are secured by flat pins driven between interlocking ends. Widths of 6 in. to 12 ft. are made, the same sizes as in expanded galvanized steel.

A die-cast aluminum housing is included in the construction of a double-acting **hand pump** to dispense liquids from containers. Liquid, particularly petroleum products, can be handled at the rate of 30 gallons per 100 strokes with the Series 1100 piston type pump made by Tokheim Corp., 1602 Wabash Ave., Fort Wayne 1, Ind. Four models include hose and spout types and automatic shut-off nozzle. Pump lifts up to 30 ft.

Charcoal fires can be started quickly by placing the Surefire electric **charcoal igniter** on charcoal bed, covering with more charcoal and plugging cord into electric socket. The fire ring is supported by gold-anodized aluminum tube. High conductivity puts heat where it's needed, then assures rapid cooling. Phoenix Consumer Products, Inc., 4901 Perkins Ave., Cleveland 3, Ohio, makes the device.

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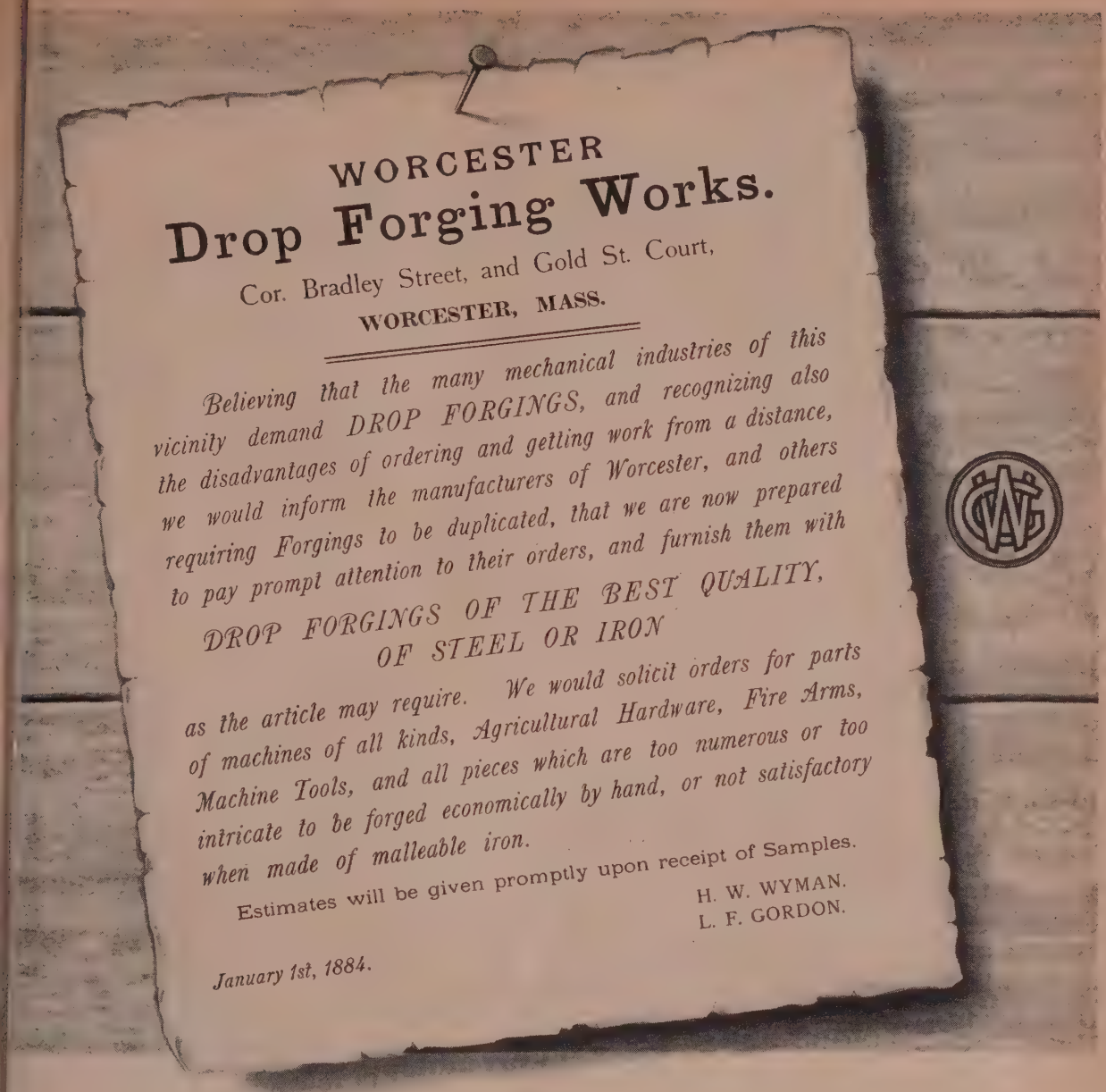
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SHORTCUT TO SHEET

By F. L. Church, Senior Editor

Molten aluminum is cast directly into quarter-inch-thick reroll sheet by the unique continuous sheet casting process developed by Hunter Engineering Co., Riverside, Calif. The cast and coiled product is ready to be cold rolled down to high quality sheet or foil. Capital cost of an installation is a fraction of that of a conventional hot mill, often cheaper to operate. Inventor Joe Hunter sees captive operations, foreign countries as the major prospects for first commercially successful sheet casting process.

A SEEMINGLY endless ribbon of quarter-inch thick, 3-foot wide aluminum sheet flows steadily from a deceptively simple looking machine, passes through a roller-straightener and an edge miller, and is wound into a tight, uniform coil.

When the coil reaches a predetermined size and weight, a shear slices through the still-moving ribbon of aluminum, the coil is quickly removed by a forklift truck, and the spooling of another coil of sheet is begun immediately. The entire operation takes place in less than 300 sq. ft. of floor space, is tended by only one operator, and "grows" aluminum sheet at a rate of 30 to 40 linear inches per minute.

Close examination of the still-hot sheet reveals a uniformly bright matt surface on both sides, clean-cut edges, and a uniform thickness, both laterally and longitudinally. It looks, for all the world, like a coil of aluminum reroll sheet produced by a conventional hot rolling installation.

In fact, it serves the same purpose as normal hot-rolled sheet. The crucial difference is that this material was produced directly from molten metal without the use of costly billet casting stations, soaking pits, heavy breakdown mills, and hot rolling mills. It is the product of the world's first commercially successful continuous sheet casting process.

This modern industrial miracle is in everyday operation at the Riverside, Calif. plant of Hunter Engineering Co. Four units are producing sheet at this spanking new plant—the birthplace of several other Hunter-developed processes. Two similar machines have been delivered to other aluminum fabricators, and others are on order or in final stages of negotiation.

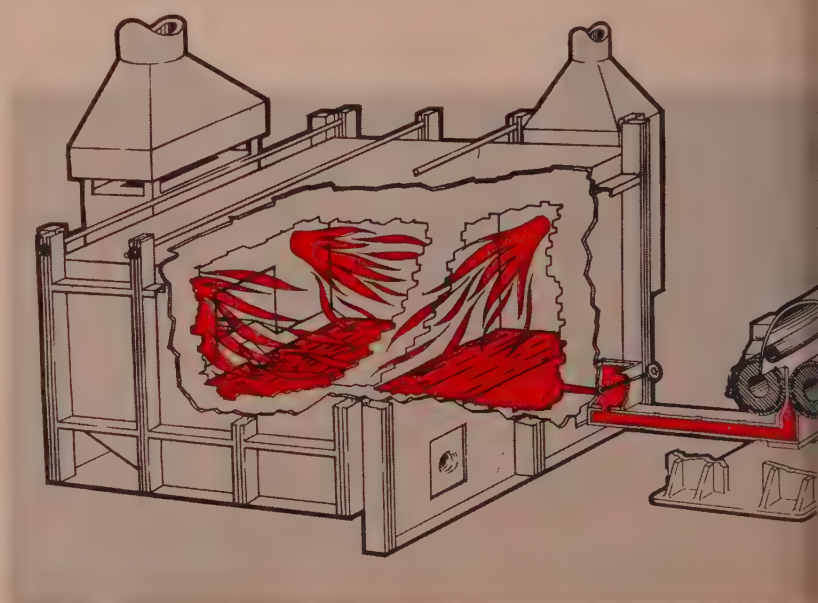
The few aluminum experts who have seen the machine in action have termed the Hunter process a technological breakthrough of great consequence to the aluminum industry. In terms of its potential impact on the economics of aluminum vs. competing materials, it could be compared to the first successful die casting machine.

The Hunter process is probably the brightest brainchild of one of the most original and prolific inventive minds in the machine design profession today. Joseph L. Hunter, president of Hunter Engineering, is a member of that rare breed of free-lance inventors who have the business savvy to nourish their creations to commercial maturity and then make them pay off.

The inventing urge bit Joe Hunter at an early age. A native of Riverside and a graduate of the city's Polytechnic High School and nearby Pomona College, Hunter entered the business world through his father's Riverside Foundry. He developed a hydraulically powered hacksaw and established the Riverside Pattern and Machine Shop to make it.

That was in 1932. Hunter Engineering Co. was established about three years later, and in '37 Joe Hunter moved the business into an old cannery plant on the other side of town. Most of his prewar work was devoted to the development of improved methods of making steel venetian blinds.

"About 90% of all the metal blinds made before the war were produced on equipment that I designed and built," Hunter recalls. "But we didn't make the



■ *Schematic drawing shows operation of Hunter continuous sheet casting process. Ingot and scrap are fed into melting hearth; molten metal flows into holding hearth, then to tap-out box. Metal then flows horizontally through launder, up through*

ds. We did the engineering and de-
pment work and built the facilities
somebody else."
unter decided to get into the busi-
of making blinds after the war.
rather than compete with the steel
d people on their own terms, he
ted to make blinds out of alumi-
).
I considered aluminum a more mer-
ndisable product, but I knew we'd
e to integrate to some degree because
minum strip at that time was prohibi-
in cost," Hunter explains. "So we
an developing special mills for re-
ing aluminum strip to the exact
th and gauge for venetian blinds.
finally came up with two 6-stand
dem mills of very high speed.
We crammed those two mills, plus
litter and a scrap baler, into a 40
t square room, and eventually
shed our production up to a million
unds of strip a month.
We operated 24 hours a day, seven
s a week, with three men on a shift.
r down time averaged only four
urs per mill per week, and our con-
sion cost was three-quarters of a
t a pound. Comparable strip—if you
uld get it—would've cost you 18 cents
pound on the market at that time."

arked H-D's Success

These were the machines and meth-
s that sparked the sudden success
Hunter-Douglas Corp., the offspring
at soon outgrew its parent. And as
-D rocketed ahead on the strength
its lucrative venetian blind business,
e Hunter plugged away at the devel-
ment of still more efficient fabrica-
on methods.
Other established manufacturers of
enetian blinds were not standing still, however, and newcomers were entering the field with cheap products that intensified the competitive strife. Hunter-Douglas needed to integrate still more, and the only direction it could go was back toward the raw metal.

Joe Hunter had the answer in a new continuous casting process that ended the company's reliance upon relatively high cost reroll sheet and enabled it to start with pig, ingot and even scrap. This method (see MM, May '52) drew molten metal from an electric induction furnace and converted it directly into continuously cast 1-inch by 7-inch aluminum slab that was subsequently cut into 55-foot lengths and hot and cold rolled down to high quality venetian blind stock at rates of up to 600 ft. per minute.

"Before too long, we were running 3 million pounds of aluminum a month into venetian blind stock alone," Joe Hunter recalls. "In fact, we reached the point where our profit margin was based on this integrated position. We were selling the finished product — painted, packaged, and delivered anywhere in the U.S.—for less per pound than you'd have paid for the bare strip on the market."

This explains why H-D's Flexalum brand consolidated its position as the dominant line in the venetian blind business. Joe Hunter's continuous casting, rolling and painting setup was later adapted to the production of aluminum awning stock, and a few casting machines were licensed to outside firms. Today, seven of the slab casting units are in operation—two of them in Europe—and they have processed well over 200 million pounds of aluminum.

With Hunter-Douglas rolling along in high gear, the inventor in Joe Hunter began to get the upper hand over the businessman. For one thing, too many pet projects were gathering dust over at Hunter Engineering. What's more, the very success of H-D convinced him that his brightest opportunities were in the development of new machines and methods for making other aluminum products.

■ *Joe Hunter, inventor of the sheet casting process and president of Hunter Engineering, stands beside coiler. Coils of cast ¼-inch thick sheet range in weight up to 8000 pounds each.*

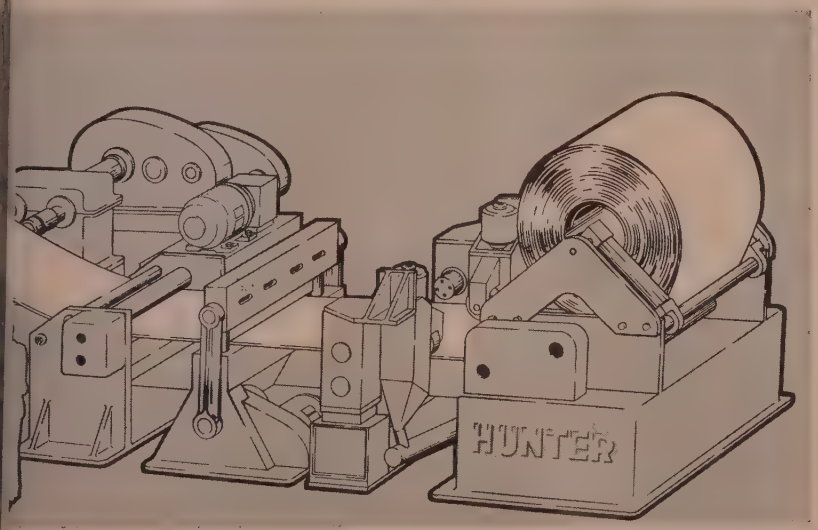
Back to Inventing

So in 1954, Hunter severed his working relationship with the West Coast's fastest growing aluminum fabricator and turned his attention to rebuilding the half-neglected engineering concern that had been his first love. He still retained his very substantial equity in H-D, however, and left with the understanding that arrangements would soon be made that would enable him to convert that equity into useable assets.

The "arrangements" were consummated in February 1956, when Bridgeport Brass Co. acquired Hunter-Douglas in a stock exchange pact that made Joe Hunter one of the largest single holders of Bridgeport common stock. Today, H-D is operated as a division of Bridgeport Brass.

In the meantime, Joe Hunter was reorganizing his engineering concern along lines that evolved during his association with Hunter-Douglas. The relationship between H-D and the parent company had established a unique pattern of integration that was applied, with refinements, in the reorganized and expanded Hunter Engineering Co.

"Basically, we are developers, designers and builders of special purpose machinery for the aluminum industry," Hunter emphasizes. "There may be others who perform a somewhat similar



spreader which distributes it across width of casting rolls. As metal solidifies rapidly just below "bite" of water-cooled rolls, the now solid sheet is forced upward, loops down through leveller and edge miller to coiler.

service, but I don't know of any other machinery builder who can take you into his own plant and show you the equipment actually producing aluminum mill products on a commercial basis."

Unique Service Because . . .

As Hunter is quick to point out, this is what makes the firm unique. It is actually two entirely different companies operating in the same plant and under the same management team. The Mill Products Division, which produces and sells aluminum sheet, rod, tubing, and other mill forms for profit, also serves as a proving ground for the processes and machines developed and built by the Machinery Division.

These inter-related operations take place in a spacious 350,000 sq. ft. plant situated amid neat patches of orange groves on an 80-acre site just east of Riverside. When construction of the facility was begun in May, 1954, original plans called for 175,000 sq. ft. of floor space.

The concrete footings of his dream plant were barely dry, however. when Joe Hunter found himself allied with a venerable and well-heeled partner. Olin Mathieson Chemical Corp., not content with its substantial holdings in everything from cellophane to hunting rifles, was making eyes at the burgeoning aluminum industry.

Olin had operated a wartime primary plant for the government, and was frankly on the make for a merger that would yield some ready-made aluminum know-how. Joe Hunter's unorthodox trail blazing was gaining wide recognition, and Olin's management probably reasoned that it stood to gain plenty from the futuristic projects on Hunter's workbench.

So, in an agreement that was quietly consummated in August 1954, Olin acquired a major interest in Hunter Engineering. The partnership was never publicly announced, and Olin's exact aims are still cloaked in mystery. Whatever the original reasons, however, it appears that Olin's subsequent decision to enter the aluminum field on a fully integrated basis through Ormet and Omal conflicted somewhat with the Hunter Engineering venture.

Arrangements were made, therefore, that permitted Joe Hunter to buy back Olin's interest in Hunter Engineering. On December 1, 1958, he once again became sole owner of the company. But Olin is still in the picture; it is cooperating with Hunter in a joint research and development program, and shares ownership of the patents on the sheet casting process.

Olin's Support Valuable

The four years and three months of partnership with Olin gave Hunter some valuable capital support through a research and development period that was necessarily low on income. He took good advantage of it.

He perfected several very promising fabrication processes, assembled a first-rate engineering-management team, built up a production facility with an ultimate capacity of 5 million pounds of aluminum products per month, and set up a machine shop that is probably equal in quality to anything on the West Coast.

So today, Joe Hunter sits securely in the driver's seat of a going concern with assets estimated conservatively at $10 million. But the men who help him run it say that Hunter grows as restless as ever when he has to spend too much time behind his desk. He would rather be tinkering in his own private research shop in a barn across the road, or wander out in the plant to gaze thoughtfully at one of the four continuous casting machines as it quietly grinds out a flawless ribbon of aluminum sheet.

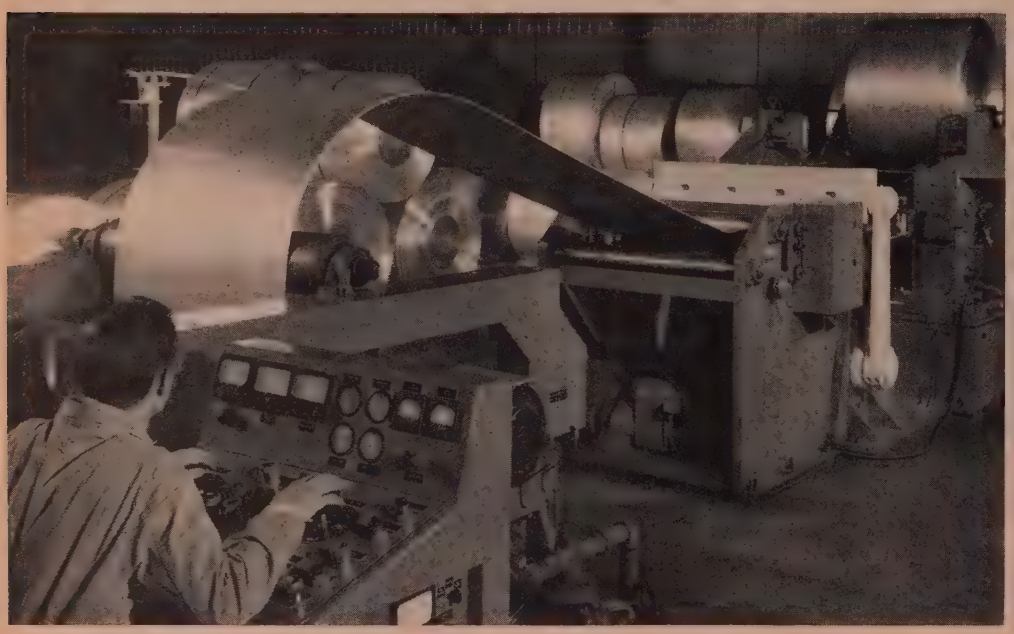
'An Entirely New Approach'

Though his prize development is in excellent running order, Hunter is continually searching for ways to improve it and its product.

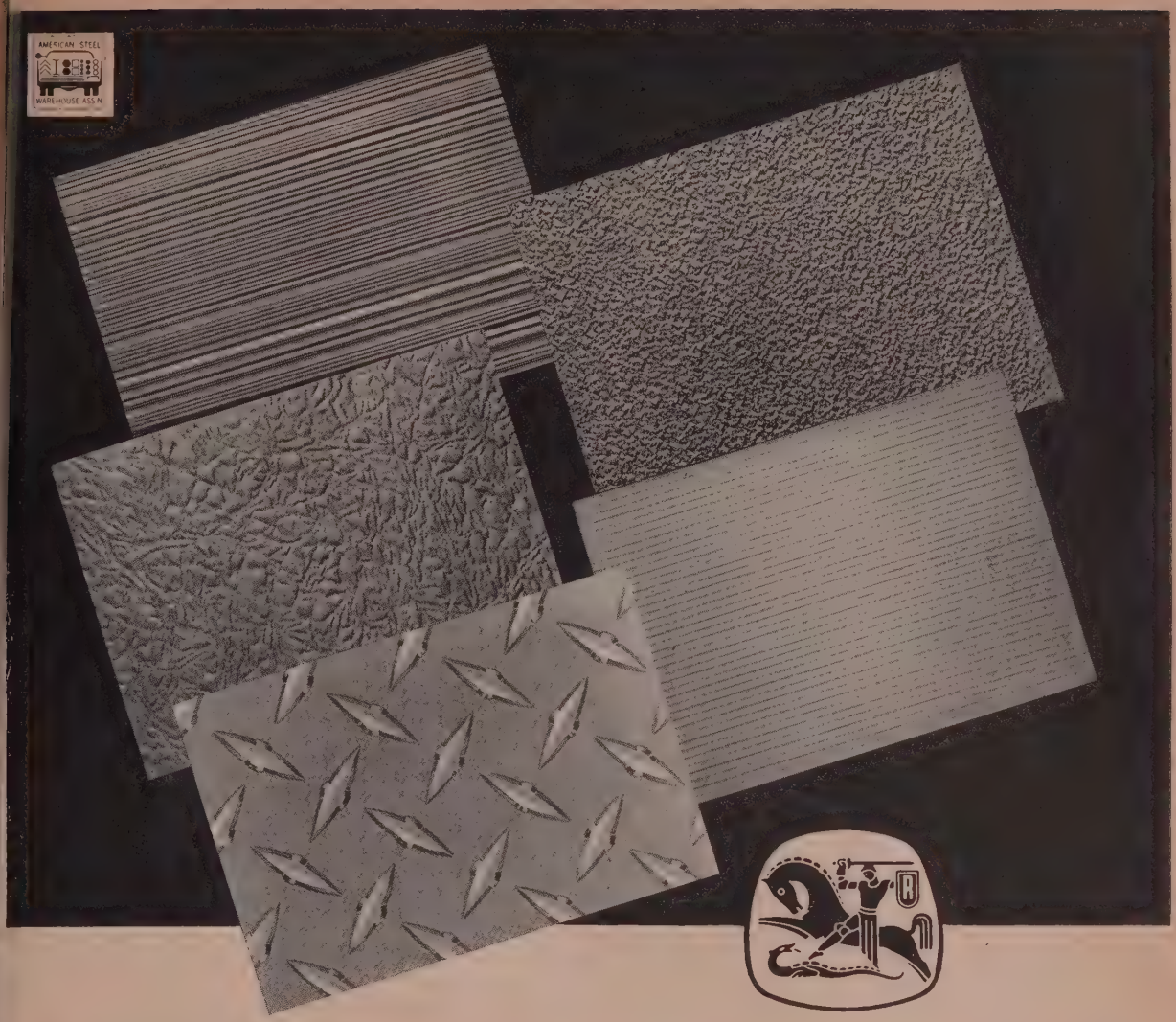
"When we completed the first machine about three years ago," says Dave Mayers, vice president in charge of operations, "we had it producing good sheet within three days. We were all congratulating each other, but Joe wasn't satisfied. We still had to develop methods of handling the cast product—homogenizing, cold rolling, and the like—and the casting machine itself could still be improved.

"So we put another million and a half dollars into development work before we had a machine and an operating technique that Joe considered ready for the commercial market." Mayers continues.

"This was an entirely new approach, and the only way to work out the bugs was through trial and error. But today we can go into a customer's plant, survey his needs, design and build and install a complete facility to satisfy those needs, and guarantee the capital cost and the operating cost. We can train their crews and give them an



■ ***Operator's view of one of the four continuous sheet casting installations in operation at Hunter Engineering. Cast sheet emerges from rolls near operator, loops down through leveler and edge miller, then is wound into coil by coiler at right background. About 20 million pounds of aluminum sheet have been cast at Hunter since first machine went into regular production two years ago.***



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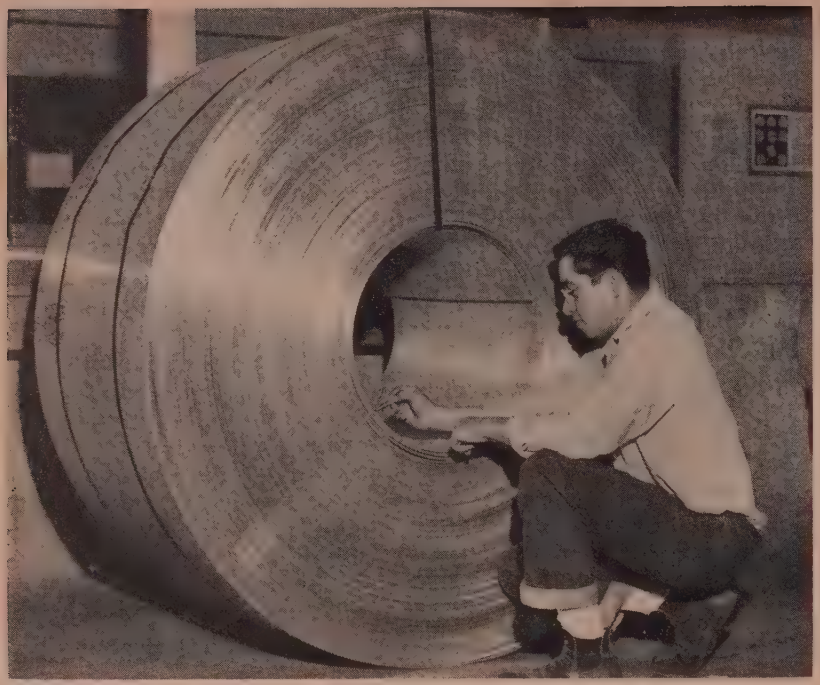

■ *A large coil of quarter-inch thick, 38-inch wide aluminum reroll sheet, continuously cast on the 40-inch machine at Hunter Engineering. Sheet has dense, solid structure; smooth, clean surface; excellent dimensional uniformity; is ready to be cold rolled without further processing. Grain is unusually fine for cast structure, though not as fine as best product of conventional hot mill.*

operating procedure that will get the most efficiency out of the equipment."

Shortcut to Sheet

Stated in the simplest of terms, the Hunter process is an ingenious shortcut to sheet, substituting a single casting phase for all of the casting, scalping, heating, breakdown, and rolling operations normally required to produce aluminum reroll sheet.

As shown in the drawing on pages 30 and 31, the installation consists of a combination melting and holding furnace, a continuous casting machine, a leveller, a shear, an edge miller, and a coiler. Ingot is fed into the 15,000-pound capacity melting hearth of the reverberatory furnace, and molten metal flows through a channel into the 15,000-pound capacity holding hearth.

The double hearth furnace is used so that the metal fed to the casting machine will remain at a uniform temperature—an extremely important factor. Any temperature variation resulting from the charging of cold ingots is confined within the melting hearth.

From the holding hearth, molten metal flows from a tap-out box horizontally through a launder, then up through a spreader which distributes it uniformly across the width of the casting machine's rolls. The molten bath in the tap-out box is held at a constant level slightly above the centerline of the rolls. Since molten metal, like water, seeks its own level, the metal is constantly under hydrostatic pressure as it enters the freezing zone slightly below the "bite" of the rolls.

These rolls, of course, are the heart of the process. They serve not only as a mold, but also as a heat sink and a source of motive power. A series of water passages is machined into the rolls. As water courses through these passages, it carries off the heat of fusion, causing the metal to change from liquid to solid.

The transformation takes place rapidly just below the centerline, and the rolls grip the now solid metal and push it upward. The rotation of the rolls is precisely synchronized to the rate of solidification. If they turn too fast the cycle is broken; if they're slow there is too much buildup at the interface of the spreader and the rolls.

Another important variable is the temperature of the metal. This depends partly upon the alloy being cast, but the preferred practice is to hold the metal at as low a temperature as possible without freezing off the cycle. Reasons: To keep grain size as small as possible; and to speed solidification, hence production.

The 40-inch machine at Hunter Engineering produces 38-inch wide sheet at rates of 30 to 40 inches per minute. As the sheet emerges from the machine it loops down into a leveller, passes through an edge miller, and is wound into a coil by the coiler. When the coil reaches a pre-determined weight—say 3 to 8 thousand pounds, depending upon the customer's order — the operator shears the sheet, the coil is removed by forklift, and the spooling of another coil is begun.

The entire set-up is almost completely automatic. The operator's principal job is to watch the temperature and level of the metal. If the temperature runs too high or too low he makes the necessary adjustments. If the metal level begins to drop he instructs the furnace man to charge some more ingot.

Sheet is cast in alloys 1100, 3003, 5005, 5050, 5052, and 6061. Others have been cast, but these alloys account for the bulk of Hunter's production. Structure of the sheet is very dense and solid, and fairly fine grained for a cast material, according to Joe Hunter.

About 20 million pounds of aluminum sheet has been cast at Hunter Engineering since the first unit was put into regular production two years ago. In a recent 24-hour period, two machines turned out 90,000 pounds of sheet. Weight of coils averages around 5000 pounds each. Theoretically, however, it would be possible to produce a coil of any weight. The only real limitation is the capacity of handling equipment.

Then It's Cold Rolled

Most of the material cast on the 40-inch machine is subsequently rerolled to finished sheet in gauges down to .003-inch. Although some alloys—notably 3003—are homogenized before rerolling, all rolling is accomplished cold, directly from cast materials. The mills—a two-stand 4-Hi tandem, and a single-stand 4-Hi finishing mill—were designed and built by Hunter Engineering.

Breakdown is accomplished on the tandem mill in one or two passes, depending upon ultimate end use of the sheet. Finish gauge from the first pass may vary from .115 to .080, while finish gauge from the second pass may be varied from .060 to .030. The mill can roll sheet at rates of from 200,000 to 500,000 pounds per 8-hour shift, depending upon number of passes and final gauge.

Finish temper passes and thinner gauges are achieved on the finishing mill, which can roll stock down to .003".

An oustanding feature of both mills is the exceptionally close control of gauge. Total gauge variation on breakdown passes can be held to ± .0005-in. On the finishing mill, gauge variation can be controlled within ± .0002-in.

The mills embody a number of Hunter-developed innovations that permit this close control of gauge and also simplify operation. Instead of using the conventional screws to adjust roll posi-

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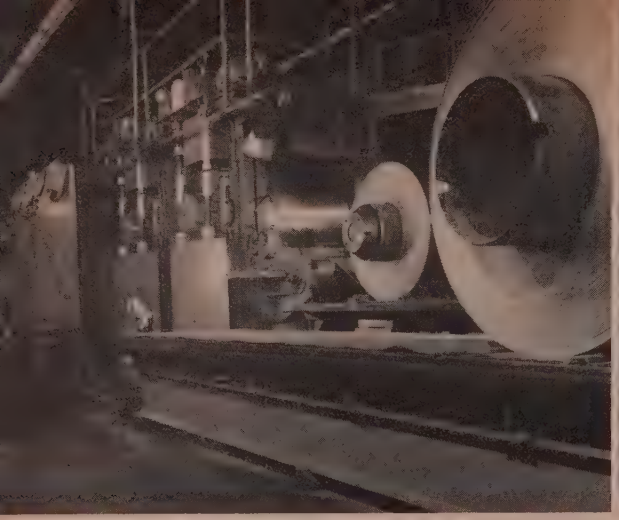
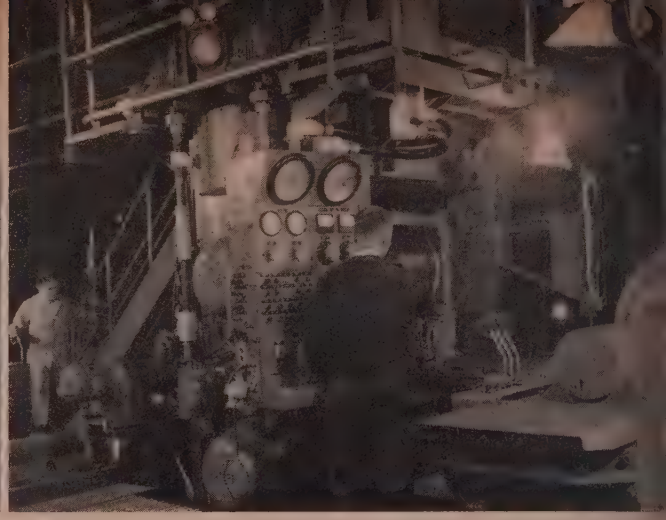
MANUFACTURERS OF METEX METAL FINISHING COMPOUNDS



■ *Most cast sheet produced at Hunter Engineering is subsequently cold rolled down to lighter gauges on these mills, designed and built by Hunter Engineering. Breakdown is accomplished on 2-stand, 4-Hi tandem (left) in one or two passes.*



Finish gauge may vary from .115 to .030. Finish temper passes and thinner gauges are achieved on single stand, 4-Hi mill at right, which can produce finish gauge of .003. Both mills feature exclusive design innovations developed by Hunter.

tions, the entire mill is hydraulically preloaded through the bearing chocks. Since this preloading is in excess of the rolling pressures to be encountered, there are no deflections in the roll stand due to pressures developed in rolling operations.

In addition to improving the rolled product, this feature permits the operator to stop the rolling operation immediately in case of trouble. He simply releases the hydraulic preload pressure, thereby disengaging the work rolls.

Unique Gauge Control

Gauge control is accomplished by power actuated gauge blocks located between the bearing chocks. Due to the design of these blocks, gauge of the rolled product may be adjusted instantly, in increments of .0001-inch, while the mill is operating under full load.

Unlike older designs, the Hunter machines feature mill housings assembled from precision ground forged steel columns which permit the fitting of bearing chocks and other working parts to closer tolerances than are possible with conventional mills

Hunter designed both mills specifically for rolling aluminum. They can handle coils up to 60 inches in diameter and with a gross finish weight of around 8500 pounds. As in all of Joe Hunter's other developments, the mills have been automated to a high degree. A 3-man crew, including the handler, runs each mill. Thus, a work force of six men can produce up to 250 tons of aluminum rolled products per 8-hour shift.

The company is presently producing foil reroll stock, coiled strip and sheet for a wide variety of customers. Most of the sheet is going into building products.

"It makes a very fine stock for roll-formed products," Hunter explains, "and it is also yielding a high grade of foil. The main reason, I think, is the fast chill in the continuous casting machine. That gives us a beter dispersion of alloying constituents than you normally get in reroll stock. The constituents have less time to migrate to the grain boundaries. This gives us a favorable pinhole count on foil stock. It also cuts scrap loss to a very low level and improves the economics of the operation."

Hunter concedes that there is room for improvement in grain size of the as-cast reroll stock. "Our finest grain material is not as good as the finest grain you can get with conventional methods. For this reason, we don't recommend our sheet for applications that require deep drawing—not yet, anyway. But we're working on grain refinement, and we expect to lick the problem through control of casting temperature and other variables."

Inventor Joe Hunter

■ *His sheet caster will have a powerful impact on economics of aluminum vs. other materials. Other processes to be announced include continuous extrusion billet caster; high speed cold extrusion of rod and tubing.*

It's Ready to Roll

With the Mill Products Division now shipping sheet and foil reroll stock at a rate of about 2 million pounds a month, Hunter feels that his casting process and rolling mills have definitely proved that they are ready for license to other fabricators. Two casting machines are in operation at other firms and three more have been ordered.

In Hunter's largest job to date, a large aluminum consumer has signed up for a continuous sheet caster that will produce stock up to 60 inches wide.

According to Ed Clovis, who heads up equipment sales, a good prospect for the sheet caster would be a company that uses anywhere from 1 million to 4 or 5 million pounds of metal per month, with not too wide a spread in alloys or gauges required. A selective licensing policy is contemplated.

"And it might not be confined to sheet users only," he muses. "Consider impact extrusion. A major problem in this field has always been the production of slugs. You could set up the continuous caster to produce quarter-inch or half-inch sheet and run the material directly through a punch press that would blank out maybe 40 or 50 slugs per wallop. And the skeleton could be simply looped up and over the set-up so that it would feed back into the furnace. How continuous can you get?

"There are many possibilities, and we're just now beginning to explore them. We expect that as the news of this development gets around, the aluminum industry people will come up with suggested applications that we haven't dreamed of."

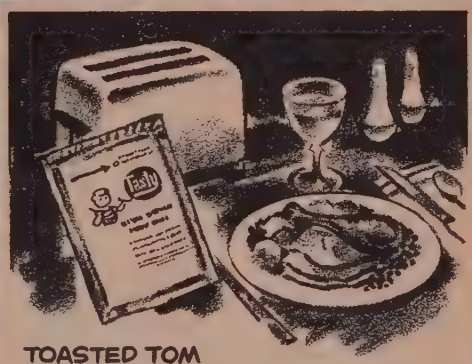
CREDIT IT TO FOIL

SCREEN STAR

TO JAM THE RADAR SCREENS OF ANTI-AIRCRAFT DEFENSES, WORLD WAR II BOMBERS RELEASED ALUMINUM STREAMERS...TODAY DISABLED BOATS FLY SIMILAR STRIPS OF FOIL FROM MASTHEADS SO COAST GUARD RADAR CAN LOCATE THEM.

KEEP UP WITH THE BONAPARTES

IN 1852 ALUMINUM COST $545 A POUND—EVEN MORE THAN GOLD. NAPOLEON III SET ALUMINUM FORKS AND SPOONS BEFORE HIS MOST HONORED GUESTS...ONLY 37 YEARS LATER, JOHNSTON BEGAN PRODUCING ALUMINUM FOIL FOR COUNTLESS, MORE PRACTICAL USES.



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HANDLING TITANIUM SPONGE FAST • SAFE • ECONOMICAL IN ALUMINUM TOTE BINS

TITANIUM sponge metal, the basic raw material for the production of titanium sheet, tube and other mill products, is expensive enough to produce without boosting its overall cost through involved handling and storing techniques.

Realizing the importance of cost-control in a highly competitive and youthful industry, Mallory-Sharon Metals Corp., Niles, Ohio, began, in mid-1957, to employ a method of materials handling in which 2½ tons of titanium sponge could be transported, carried, stored and self-discharged from one hermetically-sealed unit container—a 74-cubic-foot Tote Bin, a product of Tote System, Inc., of Beatrice, Neb.

Mallory-Sharon is utilizing 60 such bins on a five-year lease basis. (They may be purchased outright if the user so desires.) Through their use, Mallory-Sharon plans to save repeated excessive container costs, handling costs and blending operations costs.

They also plan to save warehouse space by tiering the large aluminum containers in their warehouse. Stacking the bins will be facilitated by special attachments at the corners that will lock one bin on top of the other.

Since the Tote Bins have not been fully exploited for a sufficient length of time, Mallory-Sharon officials declined to release a figure on anticipated savings.

But Savings Are There

Here is how Mallory-Sharon puts the Tote System of materials handling to work:

Titanium sponge is received from the company's sponge reduction facilities in nearby Ashtabula, Ohio. It is carried from here to Niles in the 5000-lb.-capacity Tote Bins by common-carrier flatbed trucks. At the Niles location, it is removed from the truck either by fork lift or overhead crane. The bins are weighed and recorded, then removed to storage.

The time used to unload bins is considerably less than that formerly required to remove palleted, 600-lb. capacity, 55-gallon drums. Inventory records, too, are considerably simplified. Also, the hermetic seal of the Tote Bin assures complete protection of the titanium sponge in transit.

When the sponge is to be used, the overhead crane moves the Tote Bin to a blending tower, engineered and constructed by Mallory-Sharon engineers, where the material is cascaded into any of several Tote Bins below it. After this step, the blended raw material is tested and evaluated, and held in storage. From here, the bin is carried to a feed hopper and is self-discharged.

These steps also save labor costs for Mallory-Sharon. Hand-dumping of smaller amounts, plus the extra handling between the various steps, was time and labor consuming. Now, only a few minutes' time is needed to place the Tote Bins in position, to let them self-discharge, to remove them to storage and ultimately into process.

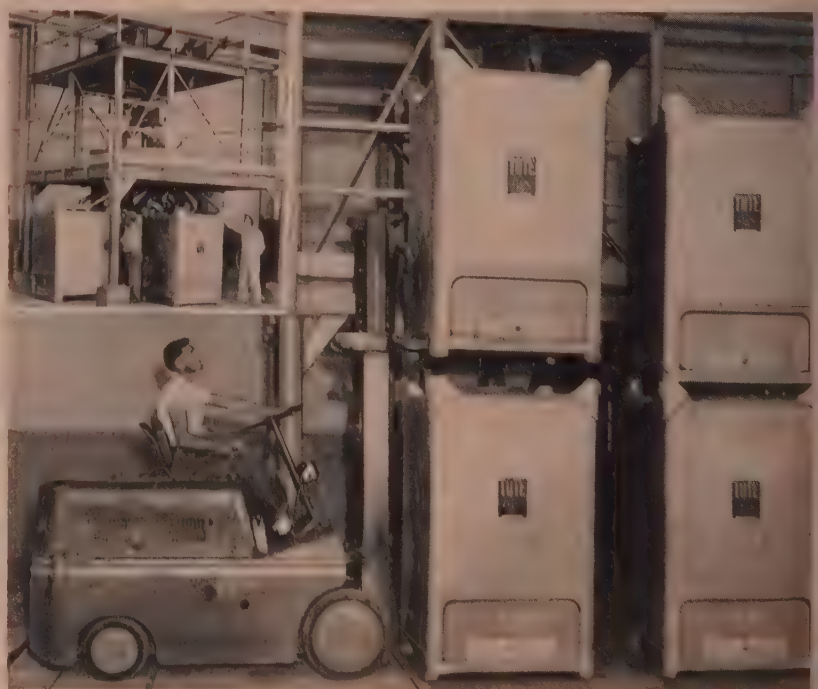
The bins at Mallory-Sharon are constructed of aluminum so that they may be employed in inter-plant activities. In some instances, Tote Bins are used totally in-plant, and other materials of construction are possible. For in-plant operations, the bins are employed either for intermediate processing or to receive the material from bulk hopper cars, rail or truck.

Mallory-Sharon's Tote Bins are Type A-74, 74 cubic-foot units which measure 42 inches wide, 48 inches deep, and 69 inches high, overall. There are four other sizes: 42, 90, 98 and 110 cu. ft. Discharge door opening in all bin sizes is 34⅛ inches wide by 14¾ inches high; filling inlet at top of bin is nine inches in diameter for all sizes.

Type A-74 bin is the most common size in use. It will hold from 600 to 6000 pounds, depending on the type of commodity handled, and weighs 225 pounds empty.

Auxiliary equipment engineered by Tote System facilitates the Tote Bin's use for a wide range of bulk handling jobs. Included is special filling station equipment under which a bin is moved for filling. A feature of this filling mechanism is the spinner head which insures even distribution of the product in the bin, eliminating the angle of repose. Positive gasketing to prevent dusting is another important feature.

A jolter can be installed below floor level at the filling station to jolt the bin 28 times per minute while filling is under way. Special discharge equipment can also be used for automatic emptying of bins. Here, special tilt equipment designed to bring the bin to a 45° tilt is combined with a specially designed hopper and screw conveyor to effect lateral discharge of the material. A gravity type discharge appliance is also available.



■ *Four-inch legs on Tote Bins facilitate fork-lift handling, while a special clamp-on attachment would be used for movement by overhead crane. Special nesting attachments at bin top corners allow stacking. Inset shows empty bins being put in place for filling.*

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AT HOME BUILDERS SHOW

.....aluminum product makers bid for more residential volume

Fifteenth NAHB annual convention and trade show, as overwhelming as ever in the range of building products exhibited, but nothing startlingly new in aluminum. Top-heavy in window and door displays; siding on up-trend.

by M. S. GREELEY

THIS YEAR is expected to be a plateau period in home building, but the National Association of Home Builders, after the fashion of all such promotional groups, feels that the opportunities are unlimited for increased business in its field. At least, that's what it said at its recent convention and trade show in Chicago.

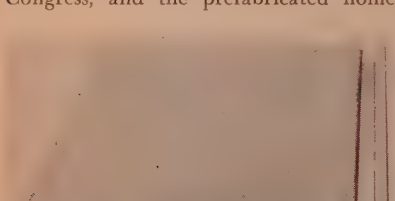
True, the usual factors favoring another rise in the home building scale are present. A rising population; a steady flow of savings dollars into thrift institutions; a desire on the part of most of these institutions to invest the accumulation in home mortgages; and a fairly stable interest rate.

Even so, despite the biggest backlog in home building contracts in the industry's history (December and January starts were 'way above normal because of this) the chances are that 1.2 million homes will be started this year, far from an electrifying increase over last year's 1,075,000.

All of which promises only a slight increase in aluminum consumption by that industry this year. A more liberal regulation allowing even lower down payments on homes might be passed by Congress, and the prefabricated home manufacturers are considered to have a rosy future. But the 1.2 million figure is still the experts' favorite guess.

At the NAHB building products show, some 400 companies took 800 exhibition booths to display and demonstrate products in 80 major categories. Not a few of these firms use aluminum for their products and many of the exhibitors anticipate a profitable year.

Consolidated General Products, Inc., Houston, Texas, expects a 100% increase in siding sales, mostly for new buildings. Before this year the largest portion of siding sold went for renovation work. Consolidated views aluminum siding as comparable in price to painted redwood siding.



■ ***New foam-backed aluminum siding called Wonder-Foam uses expanded polystyrene plastic for backing. This siding greatly deadens outside noises, will not shrink, rot or warp, and is termite resistant. Wonder-Foam is made in five baked enamel colors.***

Siding Well Represented

The firm manufactures siding panels 12 ft. 6 in. long with an 8 in. exposure. Siding weighs between 40 and 50 lbs. per square. Some companies crimp the sheet for panels with 4 inch exposure.

Alcoa supplies the .060 coil which Consolidated cold rolls to .025 inch thickness. After the metal is degreased it is Alodized and the exposed side is roller coated with alkyd melamine paint which is baked on in a gas fired bake oven. The painted coil is then formed into panels in a Yoder roll former.

Consolidated manufactures some panels with corners attached after builder has specified the number of inside and outside corners needed. Weep holes spaced about every 15 inches on the panel drain off interior condensate.

The company manufactures a number of aluminum accessories to use with the panels, including rails, trim molding, and nails. Aluminum ventilators are made by stamping louvers in a panel, then covering with a screen.

Consolidated produces two types of aluminum siding: Rexalum or plain aluminum siding and Rexalum Imperial with ½-in. fiberglas insulation bonded to it. Siding comes in seven colors and is sold through wholesale distributors.

■ ***New Van-Packer metal gas vent is double-walled, using galvanized for the outer wall, and fast-heating aluminum for the inner wall to provide good draft. Interlocking joints speed assembly, require no tools. Oval and round pipes, with all fittings, are made in all standard sizes. Van-Packer Co. is a division of Flintkote Co. in Chicago Heights, Ill.***

Lyf-Alum, Inc., of Oconomowoc, Wis., another siding manufacturer, displayed two types of siding at the exhibition. Koralum, their concave panel, is made for new building construction. Straight panels for reconstruction and renovation work are called Lifalum. Panels are .025 gauge, 3003 aluminum alloy with standard 8 inch exposure. Special accessories include outside box corner, ouside profile corner, inside corner, window and door flashing, window and door channel, and nails. The company has been in business for 11 years.

Textron Metals Co. manufactures a sizable amount of aluminum siding at its plant in Girard, Ohio, selling it under two trade names: TM Shield and TM Premier. One is distributed through wholesale distributors and the other through Textron's own branches.

Panels are 12.5 ft. with an 8 inch exposure. Special corners are made, since Textron does not approve of tailoring corners into a panel. An extruded "starter" acts as a rigid base to which other panels are fastened with the Textron "positive lock."

It is Textron's philosophy that aluminum siding should simulate wood siding. Sheet is Alodized and roller coated with 3½ mils of enamel on the front and 1 mil on the back. Panels have a five-year non-chalk guarantee.

A new foam-back aluminum siding known as Wonder-Foam was exhibited by Wisco, Inc., Detroit, Mich. Expanded polystyrene plastic is bonded to the back, acting as a stiffener and insulation. Corrosion problem encountered

(Continued on page 44)

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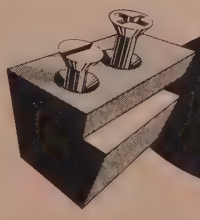

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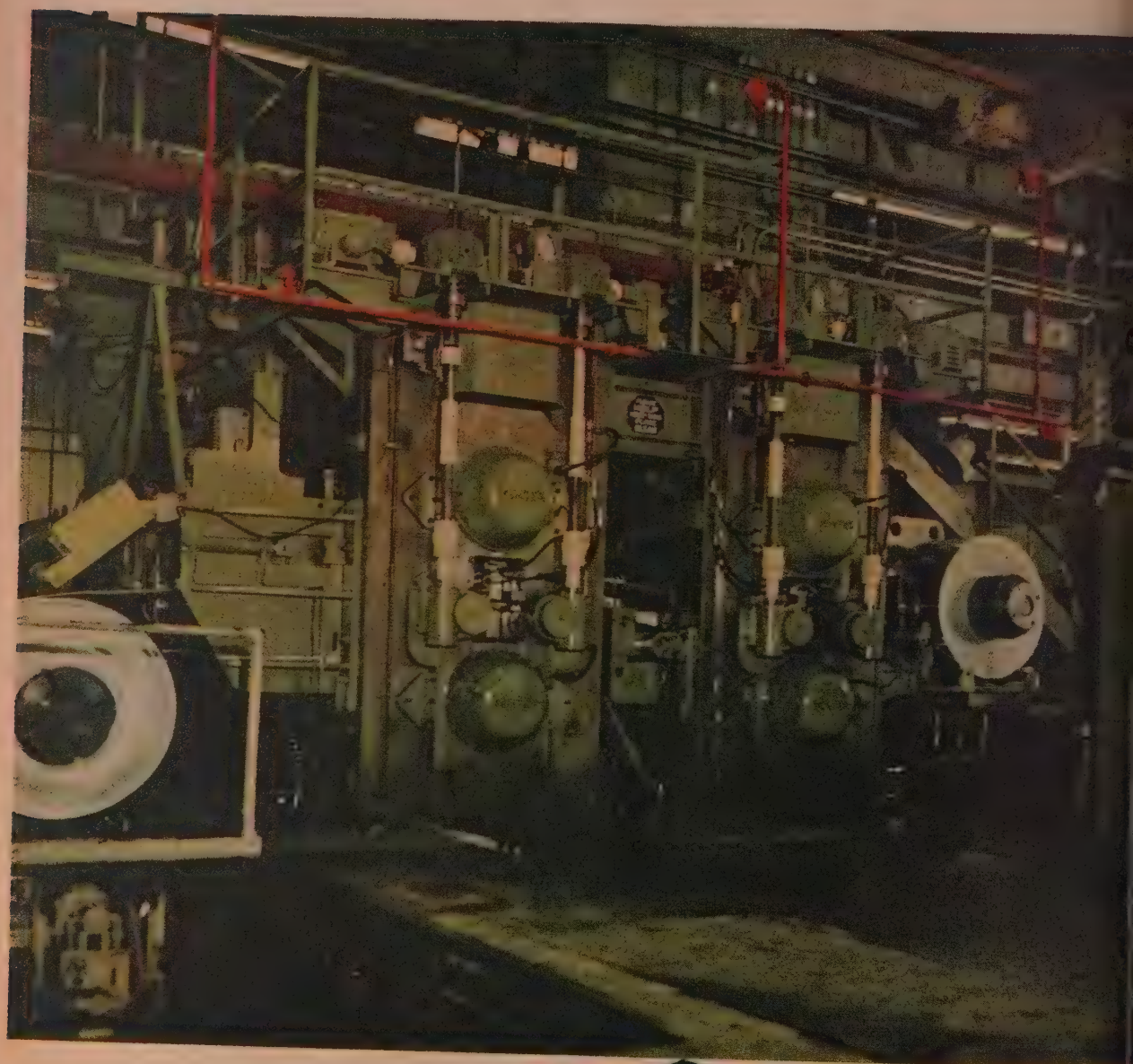
To ALUMINUM FABRICATORS



Hunter ENGINEERING CO.

nd USERS:

Hunter Engineering Company has a 15-year history of pioneering new and improved processes and machines aimed at the vertical integration of independent aluminum fabricators. Our approach has been to conceive an entire fabricating technique, then develop this concept into a practical production system.

Proving this approach, the original Hunter-developed continuous casting and narrow strip rolling process has now produced well over 200 million pounds of high quality aluminum strip. As a result of a greatly expanded research and engineering program at Hunter Engineering these past four years, *results are now being achieved that are still more significant.*

NEW HUNTER PROCESSES

Some of the new Hunter processes now completed and in practical production include:

1. **The first successful method for continuous casting of wide aluminum sheet (production to date over 25 million pounds);**
2. **An entirely new process for casting aluminum extrusion billets;**
3. **An improved high speed cold extruding technique for producing aluminum irrigation pipe, aluminum rod and bar, and other tubular products.**

Hunter Engineering differs from any other development and machinery company serving aluminum fabricators. *All Hunter equipment is proved on high volume commercial production in our own plant before being released to the industry.*

Hunter Engineering has the experience, the technicians, and the facilities to supply the following services:

Analyze your company's needs;
Engineer a production system tailored to these needs;
Build the equipment in our own plant;
Install the equipment in your plant;
Train your production crew.

We believe that these services are unique in the aluminum industry. Perhaps they can broaden your operations and improve the profit margin of your company.

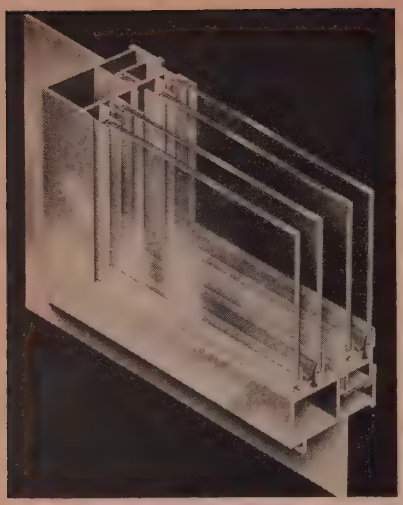
Sincerely yours,

Joe W. Hunter

J. L. HUNTER,
President

ALUMINUM PRODUCTS AND PROCESSES

1495 Columbia Avenue • Riverside, California



■ *New Slide-Master "500" aluminum horizontal sliding prime window is a product of Winter-Seal Corp., Detroit 27. The manufacturer reports maximum strength, easy installation, offering single or double glazing in the same insert.*

when new siding is installed over old is solved by the water resistant foam in combination with drip holes every 16 inches in the bottom edges.

Alsco Inc., organized as a window manufacturer in 1945, got into the siding field 10 years ago. About one-half million squares of aluminum siding were sold by Alsco last year, according to Arthur Spetrino, general manager of the company's Chicago plant. He thinks Ohio, Indiana and western Pennsylvania were the biggest markets, with the Eastern states coming up second.

"Until this year, the biggest market was remodeling," Spetrino said, "but now we're making a drive for the new construction field. We are aiming current advertising at home builders."

Alsco's siding is manufactured in Gnadenhutten, Ohio. The .025 Alodized siding is sold in a choice of 14 colors. The company's "gold back process" applied to the back of the panels by roller coating prevents corrosion. Panels are 12.5 ft. long with 8 inch exposure.

Aluminum foil backed asbestos insulation is used in gas and oil-fired heating and cooling units made by Airtemp Division of Chrysler Corp. The high reflectivity of aluminum makes it especially applicable here.

Metalbestos Division of William Wallace Co., Belmont, Calif., features aluminum inner pipe in its double wall insulated gas venting system exhibited at the show. The aluminum liner resists corrosion, gives maximum heat reflection and eliminates condensation preventing rusting in the appliance.

The Van Packer Co., Div. Flintkote Co., Chicago Heights, Ill., displayed their new metal gas vent with double wall, air insulated design. Outer wall is galvanized steel; inner wall, aluminum.

A few range hoods of anodized aluminum were displayed at the booth of Berns Air King Corp., Chicago. Berns has its own facilities for copper tone anodizing which is a finish superior, for the company's purpose, to that of real copper which must be lacquered to prevent oxidation. Berns reports that the copper-toned aluminum range hood is losing out to stainless steel, however, because there are a great number of rejects and the hood costs $10 more in aluminum.

All filters for exhaust fans made by Berns are aluminum because they are washable and may be used again. Fan blades in Berns heaters and room coolers are aluminum, tapered by shaving the tips to give a quieter and better balanced wheel. Blades in aluminum need not be painted. A bathroom ceiling heater in three models is made largely of aluminum which will not pit.

An aluminum twin reservoir pan acts as scale catcher inside Type 50 electric humidifier manufactured by Mueller Climatrol, Div. of Worthington Corp., Milwaukee, Wis.

A new type of heating system was seen in the booth of Sun-Tron Corp., Chicago. It consists of electronic panels framed in aluminum and finished in wood-grained or marbleized plastic. Each panel is a self-contained heating unit, 2¾ in. deep to be mounted on walls beneath window areas. Electricity is the heating medium.

"The new panels provide 50% radiant heat and 50% convected heat," said R. A. Weiler, general manager of Sun-Tron, "by throwing convection currents of warm air in front of windows and radiating heat into the rooms at the same time."

National Aluminum Products Co., Pittsburgh, Pa., displayed their railing fabricated of 6063-T5 extruded aluminum in either mill finish or anodized satin finish.

Railing First?

"Although aluminum railing has been available for several years, this is the first time that it has been marketed in pre-assembled, pre-packaged sections, as well as in individual custom factory made jobs," a company spokesman said.

A representative of another manufacturer of iron scroll railing, exhibiting at the show disclosed that his company is going into aluminum sometime this month. "There is a great public demand for things to be made of it, due, I think, to television and other advertising," he explained.

Ceco Steel Products Corp., Chicago, manufacturer of both aluminum and stainless steel windows, charges 10% more for aluminum than for stainless steel. "But the price levels off in the end, considering maintenance cost saved by aluminum," according to a company representative.

Truscon Steel Division of Republic Steel Corp. had some observations on steel versus aluminum in the window industry. About 40% of Truscon's windows are wood, 30% are aluminum, and 30% are stainless steel.

"The steel used in windows is considerably heavier than aluminum, and thus it makes a stronger, more durable window," the representative said. "Steel costs more to fabricate, however, and personally I think the aluminum will eventually sell better than the steel. People like the thin lines on the aluminum windows."

Pivoted aluminum windows which permit easy washing from the inside were featured by several companies, including U. S. Window Corp., Indianapolis, Ind., and Ware Laboratories, Inc., Miami, Fla.

Ronald Rosen, president of U. S. Window Corp., confided that the company's present tooling and facilities are geared to the production of 8,600 units monthly — "and we anticipate expanding these facilities during 1959."

Sliding Prime Window

Textron Metals Co., Girard, Ohio, displayed their new double-pane window featuring specially engineered hollow extrusions which, the company claims, insulate window edges positively. Frame and sash are 6063-T5 extruded aluminum of .0625 nominal thickness. Finish is natural extruded mill finish with a clear water methacrylate lacquer coating.

A complete line of aluminum windows, including jalousie, awning, double hung, horizontal sliding and ranch type was exhibited by Arnold Altex Aluminum Co., Miami, Fla. Residential products account for 75% of the company's business, said Robert D. Gibson, national warehouse manager.

The company is optimistic about the future of aluminum windows stating that 1958 "saw a fulfillment of our '57 aims. Our growth ratio increased 37.2% from $6,355,592 sales in '57 to $8,722,810 in '58. This was achieved through an intensified sales program geared to the ever expanding market."

The company-owned Metal Masters Co. supplies Arnold Altex its extrusions. Plants are located in Summerville, S. C. and Miami, Fla.

The theme of the convention and exposition, "Opportunities Unlimited," was geared toward research, merchandising and business management. Nels G. Severin, president of the NAHB at the time of the convention, stated that "the industry, facing the threat of a depression, had moved forward with confidence and in so doing helped to restore fresh bloom to other industries."

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Mass Finishing CAMERA PARTS

The finishing of aluminum and magnesium parts for Revere cameras poses several problems involving stringent quality requirements, wide range of finishes, and high volume production. Here's how one job shop metal finishing firm met the challenge.

by Louis Pellar, General Manager, Mercury Metal Finishing Corp., Chicago

MEETING high-volume production schedules is a job that faces most subcontractors or suppliers. The subcontractor's volume is necessarily keyed to the volume of the basic manufacturer. What's more, the financial resources available to the large company are usually not available to the smaller one.

As a result, the supplier is faced with several urgent problems. He must devise an initial plan for meeting high volume production. He must choose reliable equipment for his operation. He must also allow for future expansion to handle even a larger volume of business as the prime contractor himself expands.

Add to this the need for performing several different types of operations, and the scope of the problem becomes apparent.

This type of operation typifies Mercury Metal Finishing Corp. Formed in 1948, it has been the sole finisher of camera cases for the Revere Camera Co. ever since. All Revere camera cases are made of aluminum or magnesium, and require a variety of finishes including enamel, lacquer, flat finish, wrinkle finish, and bronzing, all of which are sprayed on.

In Choosing Equipment . . .

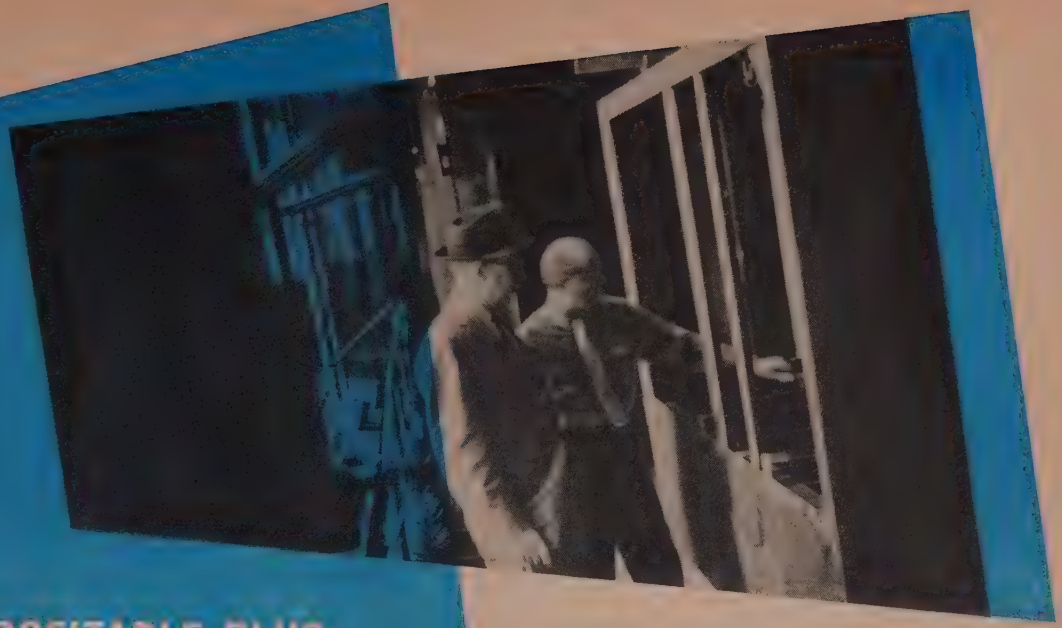
Once our initial plan was devised, we searched around for reliable equipment. Reliability was a must for us; a production stoppage would be crippling. Besides being nearly impossible to recover from, repair or replacement of equipment would be costly.

Previously, Revere did its own finishing. They were using equipment made by Binks Manufacturing Co., 3122 Carroll Ave., Chicago, and recommended it to us. Our tendency was to go along with their recommendations, but we made our own study, comparing point for point other manufacturers' equipment with Binks, keeping our own requirements in mind. We also visited other finishing plants in the Chicago area, studied their operations, listened to their recommendations. We decided that Binks equipment was best for our operation.

Our production line now consists of eleven Binks spray booths, five of which are of the Dynaprecipitor water wash type. Model 19 spray guns are used. In the Dynaprecipitor booth, every paint collecting surface is continually cleaned with water. This cuts downtime for cleaning to a minimum, which helps us stay on schedule.

Here's how our operation is set up. The initial plan called for the installation of a row of spray booths, each designed to perform one operation. For example, the first booth would apply enamel, the second lacquer, the third wrinkle finish, and so on. Since each booth does the same job all the time, no time is wasted changing from one

■ *Two of the several finishing operations at Mercury. At left, spray booth operators apply finish to trays of parts brought to them by a conveyor. At right, conveyor carries trays of coated parts up to bake oven on roof of plant.*



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type of paint or equipment to another.

The second step was to install an overhead conveyor system running parallel to the rows of booths. This permitted a continuous flow of parts—the conveyor moves constantly at the rate of 4 fpm—and also eliminated the need for programming. Parts requiring different finishes may be routed through in any sequence; if a part requires enamel only, it merely bypasses all but the enamel booth.

For a Wrinkle Finish . . .

For example, a part requiring a wrinkle finish is placed on a multiple deck rack on the conveyor and starts its journey past the booths. Each deck contains a tray of parts. Each booth is manned by a painter and a helper. As trays of parts approach the wrinkle finish booth, the first tray is removed from the rack by the helper and placed in the booth. The painter quickly sprays it, the helper places it back on the rack, and picks up the next tray. The sequence is repeated for each tray.

The operation, besides accomplishing our basic purpose of maintaining a steady flow of parts down the line, also permits one man to operate two booths in some instances.

After the parts are replaced on the conveyor, they travel to an overhead baking oven located on the roof of the building. The conveyor travels up at about a 45 degree angle, makes a turn and enters the oven. After the baking phase is finished, the parts return to the main floor and to the packing stations.

Total conveyor track length is approximately 500 feet, with 240 of this in the baking oven itself.

Making our operation expandable turned out to be a wise move. During the course of finishing aluminum and magnesium camera parts, we experienced trouble with blistering of the wrinkle finish applied to many parts. Baking shrinks the coating of paint and brings out the wrinkled appearance. But the baking temperature must be carefully controlled; studies revealed that a lower baking temperature was called for.

The difficulty lay in that a longer baking time was necessary if we were to reduce baking temperatures. We solved this problem by lengthening the oven and installing adidtional conveyor track. Where parts were remaining in the oven at 300° for 30 minutes they are now baked at 250° for one hour. Blistering is now at a minimum.

The advantage is that the rate of conveyor travel was not reduced and hence production rate was held at the same level. More important, rejects dropped from 5-8% to around 0.5%. A change such as this should pay for itself in fewer rejects in less than a year. In our case, it paid for itself in six months.

Expansion to handle an increased volume of business is also a relatively simple thing for us to perform. Since 1948 we have added additional booths from time to time to keep up with Revere's rising production schedule. We merely add another spray booth to the line next to the conveyor, and extend the track to accommodate it.

An additional line of booths has been started on the other side of the conveyor, which allows us to add booths without bearing the cost of additional conveyor track.

Between the oven and packing stations, we installed a bronzing spray booth. Aluminum parts having a wrinkle finish require a bronzing coat to add to the decorative appearance. As the parts leave the oven, they pass the booth where bronzing is put on in the same manner as paint. By the time they reach the packing station the parts are dry and may be safely handled.

If future increases make it necessary it will be a simple matter to add another bronzing booth next to the existing one.

All told, we have been very successful in handling increased production rates, and at the same time turning out a quality product. Most important we have held costs down in doing so. By concentrating on just a few manufacturers for our most important equipment, we have been able to standardize where necessary, and can reap the benefits of maximum interchangeability.

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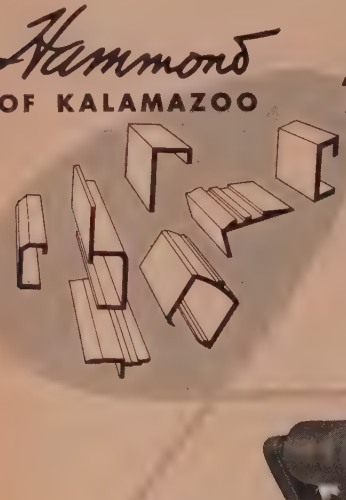

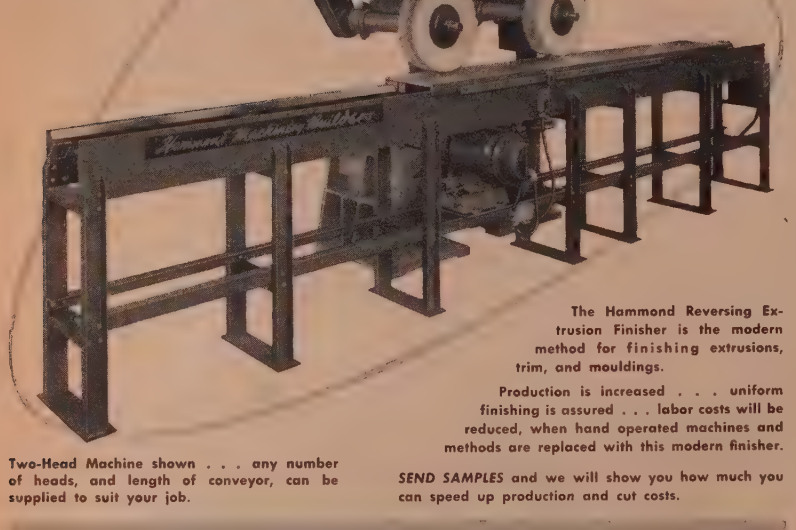

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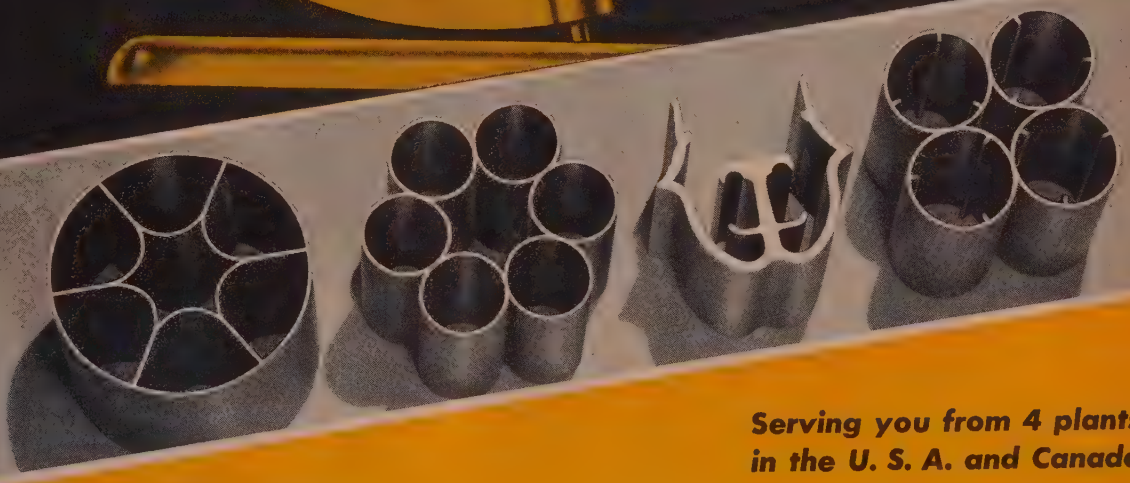

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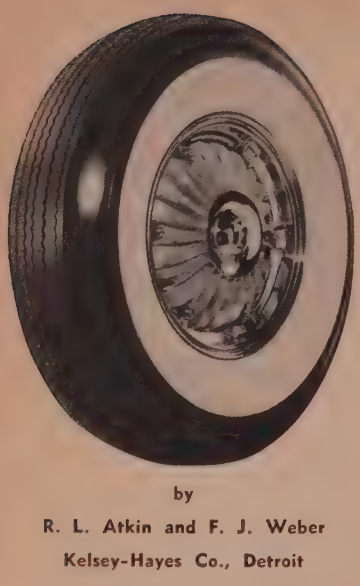


Aluminum Winning Out In Wheel-Drum Drive

Chances are that most 1960 autos will be equipped wit integral bimetallic wheel-drums — some, perhaps, wit the handsome Kaiser Aluminum design shown at the lef Kelsey-Hayes engineers report favorable test results o wheels using the Al-Fin metallurgical process for bond ing aluminum wheel drums to cast iron brake liners Tests of other bonding processes are discussed. Big Thre auto makers are now testing en masse.

by
R. L. Atkin and F. J. Weber
Kelsey-Hayes Co., Detroit

SINCE the automotive wheel brake is basically a means of converting kinetic energy into thermal energy, the main problem of the brake engineer has always been one of heat dissipation. Adverse factors such as increased car weight and the 14-inch wheel have tended to retard this dissipation. Much experimental effort and expense have been devoted to searching for means of quickly carrying the heat from the drum braking surface and then dissipating it as rapidly as possible.

The principal types of aluminum drums evaluated fall into three categories (see Figure 1): Mechanically locked liners; metallurgically bonded liners; and other types.

One mechanically locked liner design is the flared rib type using a radial rib with lateral cast-in holes. When aluminum is cast around the liner, locking is gained by filling the holes in the liner rib with molten aluminum.

Another type is that in which a 12 to 18 foot long cast iron pipe of appropriate diameter is cut into straight liners of desired widths. Locking of this type of liner to the aluminum is obtained by using a rough cast lattice-like surface on the outside diameter of the liner obtained through use of a special mold coating material.

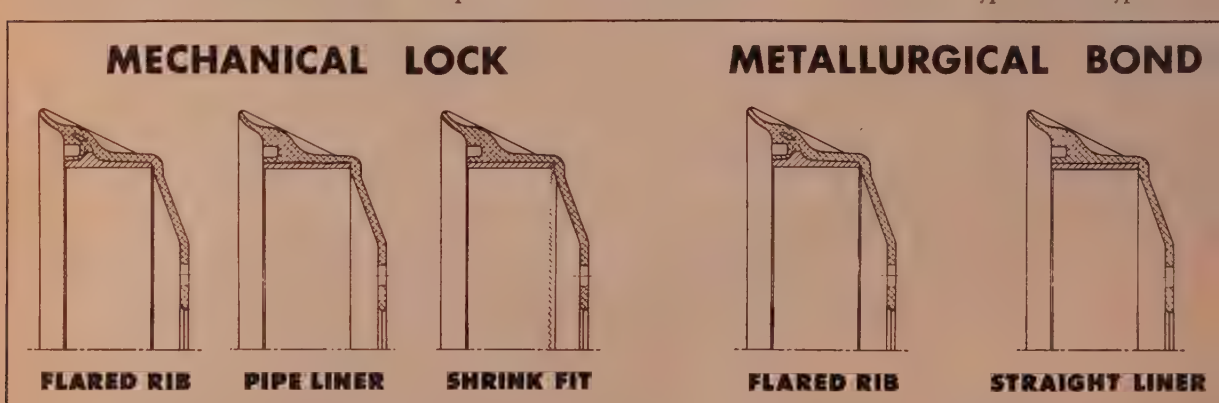
In the third type, the shrink-fit liner, the inside of the aluminum drum casting and the outside of the cast iron liner are machined to controlled dimensions. With the aluminum heated and the liner cooled, the liner is inserted into the aluminum shell so that, on return to ambient temperature, a predetermined diametral interference exists between the outside of the liner and the inside of the aluminum. Serrations on the back edge of the liner are pressed into the aluminum when the liner is inserted to aid in preventing the liner from rotating under brake torque.

There are two types of metallurg cally bonded cast iron liners—one wit both mechanical and metallurgical loc ing, and the other with metallurgic lock only.

In both cases, the cast iron liner dipped into a molten aluminum bat before the outside shell of aluminum cast to obtain a metallurgical bond b tween the aluminum and cast iron. Th primary motive in testing a drum hav ing both mechanical and metallurgica locks was to directly compare heat co ductivity from iron liner to aluminu with and without a metallurgical join in otherwise identical drums.

The third category includes severa types of surface treated aluminu drums. Brake linings were run directl against bare, hard-anodized, and chrom plated aluminum braking surfaces. W have also been experimenting with thin layer of steel sprayed onto th aluminum to form the braking surface

The final type is the hypereutecti



■ *Fig. 1. Principal types of aluminum wheel-drums being evaluated at Kelsey-Hayes Co. are mechanical lock and metallurgical bond methods of joining liner to drum. Tests showed superior performance of metallurgical bonded types. On the basis of these tests, conducted by Kelsey-Hayes, the Fairchild Engine & Airplane Corp.'s Al-Fin Division metallurgical bonding process will be used in wheel-drum production for the Big Three auto companies.*

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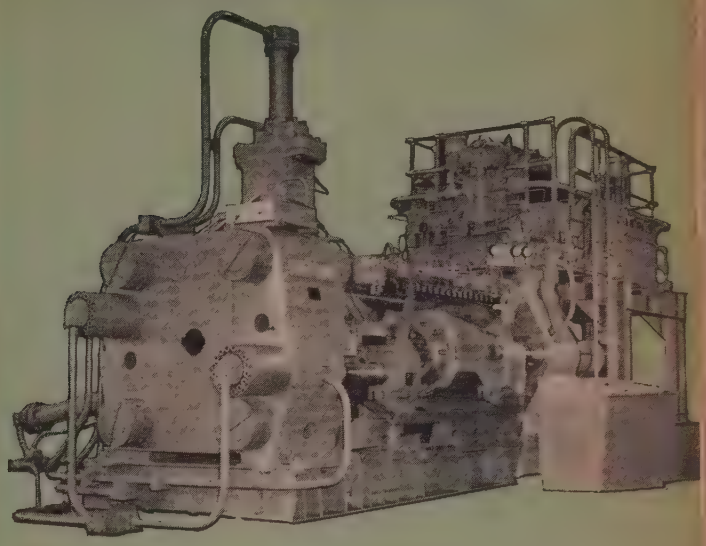

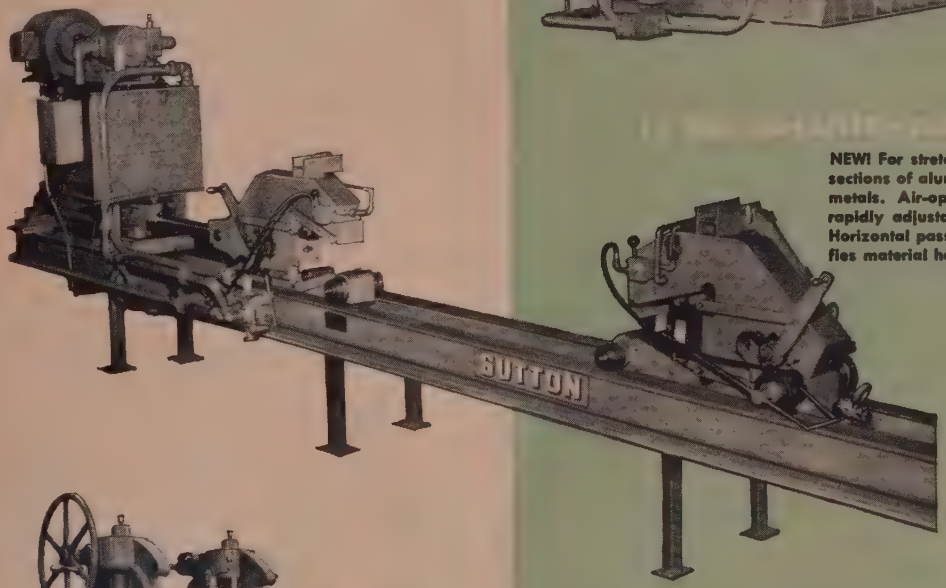

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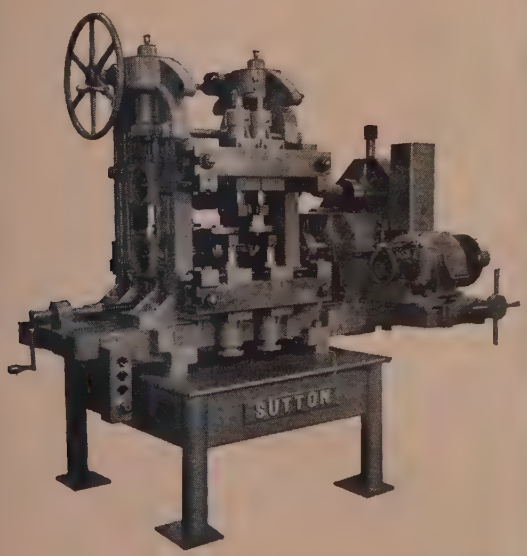

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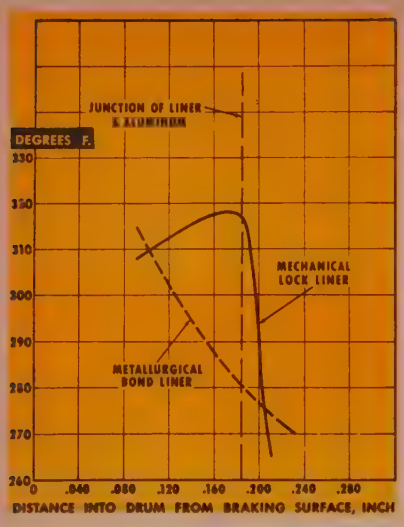

■ ***Fig. 2, showing how the mechanical bond creates a heat dam at the junction of the iron liner and the aluminum drum during braking.***

silicon aluminum alloy drum in which silicon contents from 18 to 25% are being evaluated. No cast liner is used; the brake lining is run against the high silicon aluminum alloy.

Using a dynamometer to compare heat dissipation of the mechanical lock versus the metallurgical bond, two drums of identical construction were tested. One employed only the mechanically locked liner, while the other used the metallurgical bond as well.

Thermocouples were installed at radial intervals through the liner and the aluminum outer shell. Stops were made at various speeds, decelerations, and intervals to determine if a heat barrier existed at the junction of the liner and aluminum.

The graph in Figure 2 shows that under the same procedure with the same temperatures .090″ from the braking surface, the temperature gradient across the drum with the metallurgical bond is rather constant. With the mechanical bond however, a heat dam at the iron-aluminum junction is evident.

Mechanical Lock Tests

During tests on the mechanical lock drums the temperature of the iron adjacent to the junction was slightly higher than it was at .090″ from the braking surface. Apparently, the curve temperatures represent a very slight soak period at the end of the stop, and some cooling was taking place at the braking surface of the drum.

We also ran a series of fade and recovery tests to further evaluate the mechanical lock versus the metallurgical bond. These tests utilized aluminum drums with identical flared rib liners; one type had the mechanical lock only, the other had a metallurgical bond as well. The drums were alternately rotated from the left to right front brake positions for each test.

During these road tests, lining temperatures were measured with thermocouples in the brake linings. Results again showed lower temperatures with the metallurgically bonded liner. Also, a considerable amount of brake roughness was encountered—more with the mechanical lock than with the metallurgical bond.

On this basis—as well as to conserve weight—the flared rib was abandoned in favor of a simpler straight cast iron liner. With this type of liner metallurgically bonded, the cooling characteristics were very good. Temperatures were lower with the aluminum drums than with the production cast iron drums, and the rise in brake lining temperature was very small during the stop. More rapid recovery of the aluminum drums was also evident.

The shrink-fit liner shows the most promise among mechanically locked liners. Dynamometer tests have shown the heat transfer of the shrink-fit to be almost as good as the metallurgical bond construction. Road tests also bear out the good heat transfer characteristics of the shrink-fit. Lining temperatures, temperature rise during the stops, and recovery are only slightly different with either type of construction.

Dynamometer tests were also run on plain aluminum, anodized aluminum, and chrome plated aluminum braking surfaces. None of these was satisfactory with standard linings because of scoring and wearing of the braking surfaces.

Test results on aluminum alloys having various silicon contents from 18 to 25% have been encouraging in that machining, braking surface condition, and brake effectiveness appear to be good. Lining wear life running against high silicon alloys at the outset of this program was only 15% that of the same lining against production drums. With the gains recently made with these alloys, however, we can now obtain 80% of the lining life of production drums.

Aluminum drums with sprayed steel braking surfaces are also receiving a substantial portion of our dynamometer and road test development time. Results are encouraging because of the excellent heat transfer through the thin sprayed steel liner.

To supplement our dynamometer test data on sprayed steel liners, we have also had test cars running on endurance with this type of aluminum drum. While results are promising, the information obtained to date indicates brake lining changes are likely to be required to improve effectiveness. The sprayed steel liner is much harder than the cast iron braking surface of production drums, resulting in a somewhat lower coefficient of friction between liner and lining. The hardness of the sprayed steel liner has also presented a problem in machining.

Summing up our efforts on aluminum drums, we are emphasizing four

■ ***Fig. 3. Cross section of integral wheel-brake drum of cast aluminum with bonded-in cast iron liner. Kelsey-Hayes tests on the integral hub and drum assemblies have shown that lower brake lining temperatures gained with aluminum produce improved brake stability and substantially greater lining life.***

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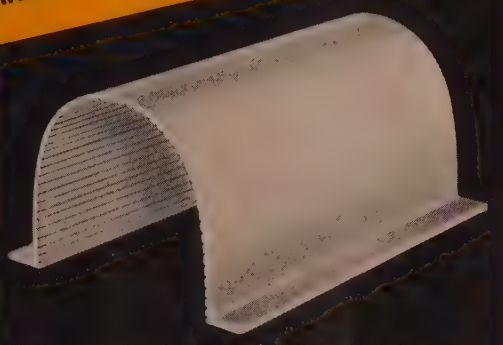

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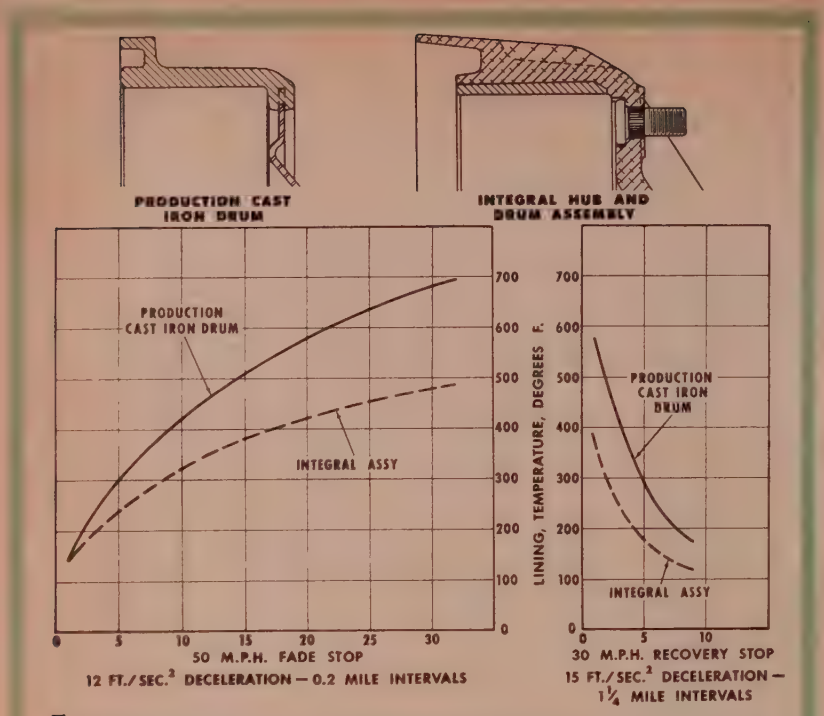


■ *Integral wheel-drum evolved by Kelsey-Hayes not only has heat radiating surface on the outer periphery of the drum ring but also extends it into area normally occupied by drum back and disc or spider. Result: Much greater exposure to air stream as well as a reservoir for high heat input brake stops.*

types of aluminum drum construction: The straight metallurgical bonded liner; the shrink-fit liner; the sprayed steel liner; and the high silicon aluminum alloy drum.

With the success encountered in developing aluminum brake drums which gave exceptional performance, free from brake noise or roughness under severe braking conditions, it was decided to further extend the use of aluminum to find a point of diminishing return in terms of brake performance.

By obtaining more aluminum heat radiating area and more air flow across this area, we would theoretically anticipate further improvement in braking performance. To achieve this we designed an assembly which not only had a heat radiating surface on the outer periphery of the drum ring but also extended it into the area normally occupied by the drum back and the disc or spider (see Figure 3).

This design not only offered the ultimate in exposure to the air stream but also provided an open air path completely across the drum. The large mass of aluminum also served as a reservoir for high heat input brake stops.

Metallurgically bonded liners were incorporated into the integral design because of the good heat transfer characteristics, the brake smoothness, and the noiseless brake operation we had experienced previously. Also, since the drum back in the integral hub and drum assembly serves as a structural portion of the wheel, high purity A356 aluminum having high elongation was specified.

Prototypes were tested on our rotating fatigue and rim test machines to compare the integral design's fatigue life and strength with that of the standard production steel wheel. Initial test results were very good except for loosening of the bearing cups in the aluminum castings.

Strain gage checks showed that additional aluminum thickness was required in the hub barrel area to keep combined assembly and load stresses below the yield strength of the section. After this material was added, further wheel tests were satisfactory.

We then began car tests on the integral hub and drum assemblies, and results were most encouraging. Numerous tests under a variety of conditions showed the superior performance of the integral construction. Because of the lower brake lining temperatures, brake stability is much improved (see Fig. 4).

Wear tests also indicate that we may expect substantially greater lining life because of the lower temperatures. Apparently because of the dampening features of the construction, no brake noise has been experienced.

Although the cast ribbed configuration can be modified for styling variations, it was decided that we should know to what extent use of closed or vented wheel covers would impair the performance of the integral design. Tests were run with steel wheel covers installed over the integral assemblies.

While temperatures were somewhat higher and recovery slower, the brake performance was still quite good. Preliminary car tests, using various sizes and locations of openings in the wheel covers to allow air flow across the drum, indicate that the combination of properly vented covers and integral aluminum hub and drums may offer an acceptable compromise offering adequate brake performance and present wheel cover styling flexibility.

Summing up our conclusions as to the use of aluminum in brake drums, the following advantages have been found in our test and development programs, but are particularly evident in the case of integral construction:

1. Appreciably lower brake operating temperatures with resultant elimination or substantial reduction in fade tendencies.

2. Substantially longer lining life because of the lower brake operating temperatures.

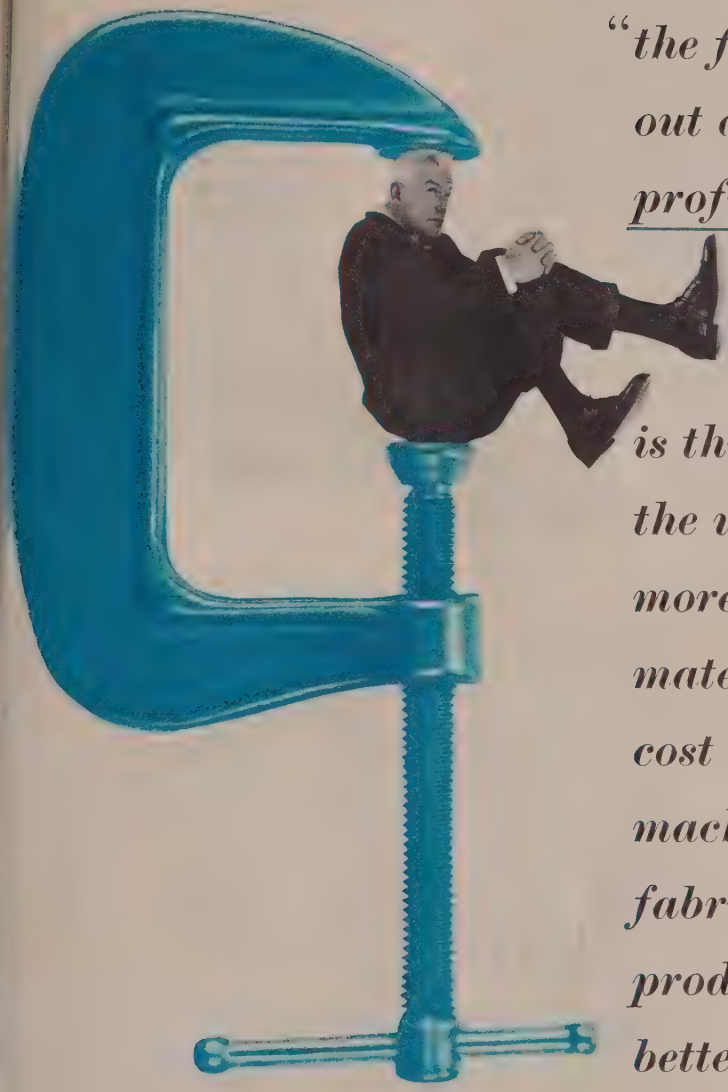
3. Greater brake stability and freedom from erratic action due to lower temperatures.

4. Greatly reduced brake noise even after extremely severe brake usage.

Kelsey-Hayes Co., Detroit, the nation's largest producer of automobile wheels and brake components, and Al-Fin Division, Fairchild Engine & Airplane Corp., Deer Park, N. Y., collaborated in production of the various types of test wheels referred to in this article.

Nine divisions of the automotive Big Three are now testing these wheels which consist of an integral cast aluminum wheel, hub and drum bonded by the Al-Fin process to a cast iron friction liner. The combination results in a lightweight, faster cooling, longer lasting braking system which is hailed as the solution to problems of positive braking of today's overweight, power-packed cars.

The fact that Kelsey-Hayes has obtained a license to use the Al-Fin bonding process signals early adoption of some of the integral bi-metallic wheel-drums now under test.



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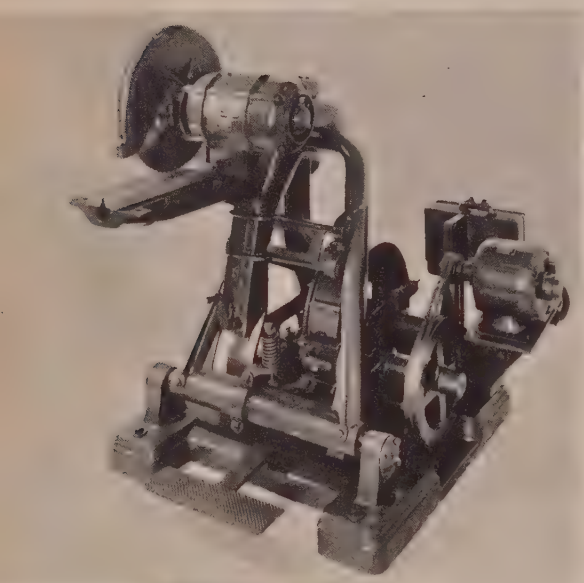
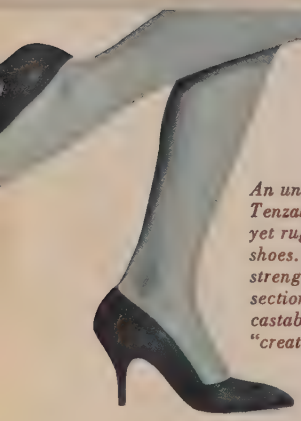
Federated TENZALOY



The vibration, strain, and abuse undergone by the movable arm of this cut-off saw calls for Tenzaloy, more and more the most qualified material for hard usage applications of this type.

Tenzaloy replaced a more expensive alloy in casting this airplane turntable when increasing size and weight of today's planes required a casting so large (4000 pounds!) that no heat treating equipment could handle it.



An unusual use for Tenzaloy is as a beautiful yet rugged heel in women's shoes. With tremendous strength in thin cross sections and excellent castability, Tenzaloy "created" this application!

Today's cooks choose shiny lightweight utensils cast in Tenzaloy over old style cast-iron pieces which often left ugly rust streaks. With corrosion-free Tenzaloy, there's no chance of contamination—ever!

Corrosion engineers expect these New York street signs to stay rust-free and shiny for years. In fact, they are unconditionally guaranteed maintenance-free for 15 years!

Tenzaloy contributes great strength in thin cross sections to these handsome modern chairs. Its castability in single-piece complex shapes, opens up wide new possibilities for the furniture designer.

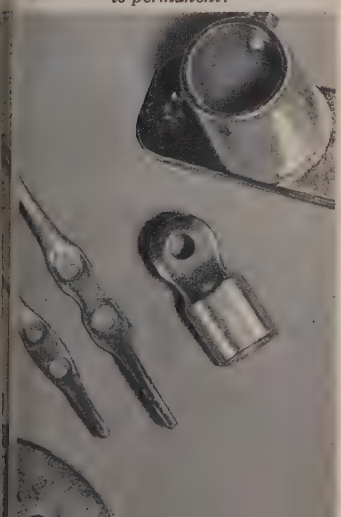
...self-aging aluminum alloy gives you castings with greater strength-

for less! Tenzaloy the self-aging aluminum alloy needs no heat treatment! If your aluminum castings are too large or too intricate for heat treatment, if your heat treating facilities are limited, if you need superior strength than you get from ordinary heat-treated alloy, specify "Federated Tenzaloy" developed by Federated to meet the need for a superior aluminum alloy that ages at room temperature. Tenzaloy eliminates rejects due to warpage, expansion, and internal stresses caused by quenching. Tenzaloy finished properties are stable, proved by conclusive test data over a ten-year period. No special foundry techniques are required. No fluxes. Castability is excellent with sand cast and plaster molds and many permanent molds. Tenzaloy will not "grow," produces corrosion-resistant castings with excellent polishing characteristics and anodizes clear white.

Specify Federated Tenzaloy for:

1. High "as cast" properties—no heat treatment required to get the properties of heat-treated castings.
2. High yield strength—Tenzaloy can be stressed beyond other high-strength, non-aging alloys.
3. Excellent ductility, particularly before aging—if it is desired to cold work or form castings, it should be done as soon as possible after casting, preferably within a day or so.
4. High impact and shock resistance.
5. Excellent machinability—better than the common aluminum-copper alloys. Machinability maximum after aging several weeks, or after artificial aging at 250°F. If machine operations are performed too soon after casting, some tendency to gumminess will be experienced.
6. Superior corrosion resistance—equivalent to the aluminum-silicon alloys.
7. Excellent polishing characteristics—will produce silvery-white castings that take a high polish.
8. Takes a white anodized finish—castings can be dyed all available colors; porosity-free surfaces are essential for satisfactorily utilizing current commercial dyeing procedures.
9. No special foundry technique required—handles like any other aluminum alloy. Heat to required temperature, skim and cast. Magnesium additions normally not required.
10. Good castability—produces sharp impressions, clean castings.
11. Permanent molds can be used—thin-walled, restrained, intricate shapes should be avoided.
12. Plaster molds can be used—properties superior to other aluminum alloys will be obtained. Excellent castability.
13. No fluxes needed—skimming alone is sufficient. A flux may be used to assist in dross removal where necessary. All stirring and excessive turbulence during pouring should be avoided.
14. Dimensionally stable—Tenzaloy does not grow as do other aluminum alloys containing copper and silicon as major alloying elements.
15. Internal stresses normally found in high-strength heat-treated castings are not present because quenching is not required.
16. Can be brazed by standard techniques used for wrought alloys; oven or flux-dip method.

Unlike heavy old-style fixtures, awning hardware cast in lightweight Tenzaloy defy rust and outdoor wear. No painting needed; the bright finish is permanent!



COMPOSITION AND COVERING SPECIFICATIONS

The nominal composition of Tenzaloy is: Copper—0.8%, Zinc—8.0%, Magnesium—0.4%, Aluminum—balance.

Tenzaloy is covered by SAE 315, ASTM Specifications B179-58 alloy ZC81A-B for Ingot; B108-58T alloy ZC81B for Permanent Mold: and B26-58T alloy ZC81A for Sand Casting. Tenzaloy is covered in Government Specifications by MIL-A-17129 (Ships) Class 8, MIL-A-12033 (ORD) alloy ZC81A, and Federal Specification QQ-A-6016 Class 22M.

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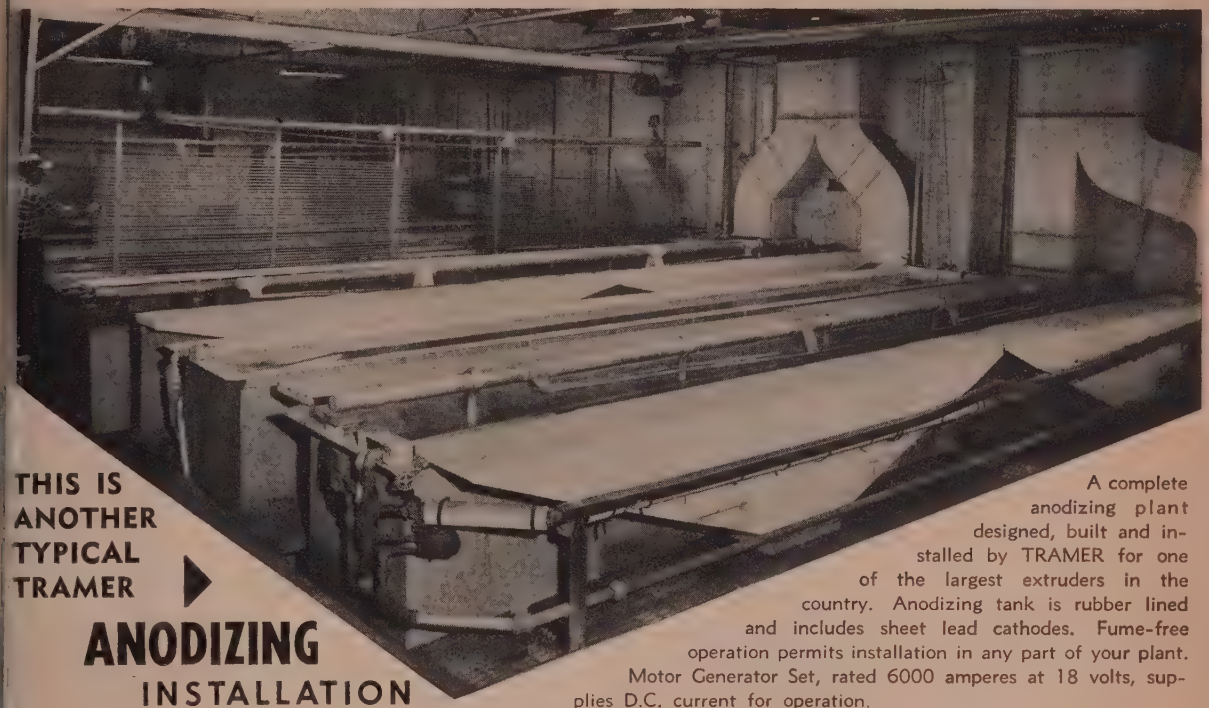

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MAGNESIUM BATTERY CASES LICK MISSILE AND TORPEDO WEIGHT PROBLEMS

STRENGTH, ease of fabrication, and light weight are the primary considerations in the selection of materials to be used in the cases of missile and torpedo batteries. This is why both aluminum and magnesium are used extensively by Yardney Electric Corp., New York, in the manufacture of its Silvercel batteries.

According to Yardney, these units are six times lighter and five times smaller than ordinary storage batteries. The company's batteries are currently used in 19 U. S. missiles—including the major intercontinental and intermediate range ballistic missiles—and in U. S. Navy torpedoes.

Because the powerful Yardney batteries are so compact and light, they allow more room for important components in missiles. In torpedoes, the range was more than tripled because Silvercel batteries increased running time from 5 to 18 minutes.

Magnesium and aluminum play major roles in supplying the lightness and strength advantages to cases for Silvercel batteries. These metals not only mean significant weight reductions and improved manufacturing, but they have also proved able to withstand extreme mechanical and environmental strains in missile and torpedo operations using Yardneys' silver-zinc batteries.

Magnesium alloys, whether sand cast, extruded or fabricated from sheet, are used for battery cases when weight, identical reproduction and ease of manufacture were critical. Magnesium also offers good resistance to the electrolyte in the Silvercel battery.

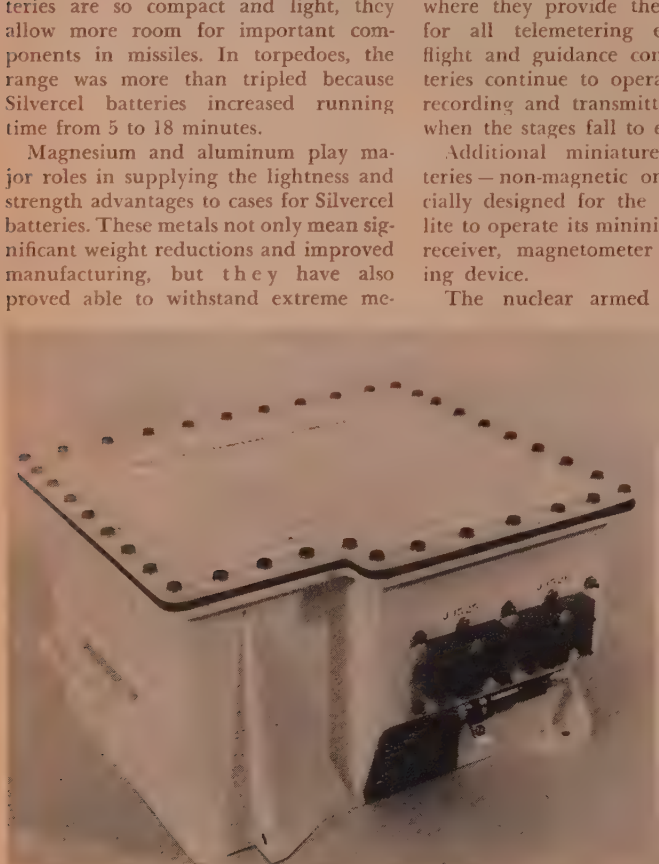
The 30-volt, 20-ampere-hour batteries employed in Project Vanguard use AZ91 magnesium alloy for their rectangular casings, which are ⅛-inch thick and measure 9½ inches by 9⅛ inches by 5 inches. These identical Yardney Silvercel batteries are mounted in both the first and second stages of the Vanguard, where they provide the electric power for all telemetering equipment and flight and guidance controls. The batteries continue to operate all the data recording and transmitting instruments when the stages fall to earth.

Additional miniature Silvercel batteries — non-magnetic ones — were especially designed for the Vanguard satellite to operate its mininitrack, command receiver, magnetometer and telemetering device.

The nuclear armed Astor torpedo currently being developed by Westinghouse also uses a Silvercel battery encased in AZ91 magnesium alloy. The case is ¼ inch thick and 76 inches long made up of two 38-inch trays, each weighing 38 pounds. The entire cradle shaped case fits into a tube 16-7/16 inches in diameter.

The Bomarc missile uses two types of Yardney Silvercel batteries, both encased in HK31A magnesium-thorium alloy. One, a 45-volt, 80-ampere-hour battery has a case which is approximately 5/32 inch thick, and measures 16 inches long 14 inches wide and 9 inches high. Use of magnesium alloy in the case has reduced the weight of this battery from 120 pounds in the original case material to 107 pounds in magnesium.

While the 45-volt, 80-ampere-hour Silvercel provides electric power for the hydraulic pump motor used in steering the Bomarc, another Silvercel serves as a basic source of energy for the guidance electronic equipment ("intelligence" section) and the telemetering instruments. This battery is also encased in magnesium-thorium alloy, thereby gaining the same percentage of weight saving as the 45-volt, 80-ampere-hour Silvercel. The case is about 5/32 inch



■ *Left photo: A special magnesium-thorium alloy, HK31A, was used for the case of this Silvercel 45 volt, 80 ampere-hour battery because the alloy is both light in weight and high temperature resistant to meet the requirements of the Bomarc missile. Bomarc also uses other Yardney Silvercel units to power its guidance control equipment and telemetering instruments. Right photo shows the Yardney 30 volt, 60 ampere-hour battery which supplies power during flight of the Air Force Atlas ICBM. The cylindrical case is made of AZ 91 magnesium alloy.*

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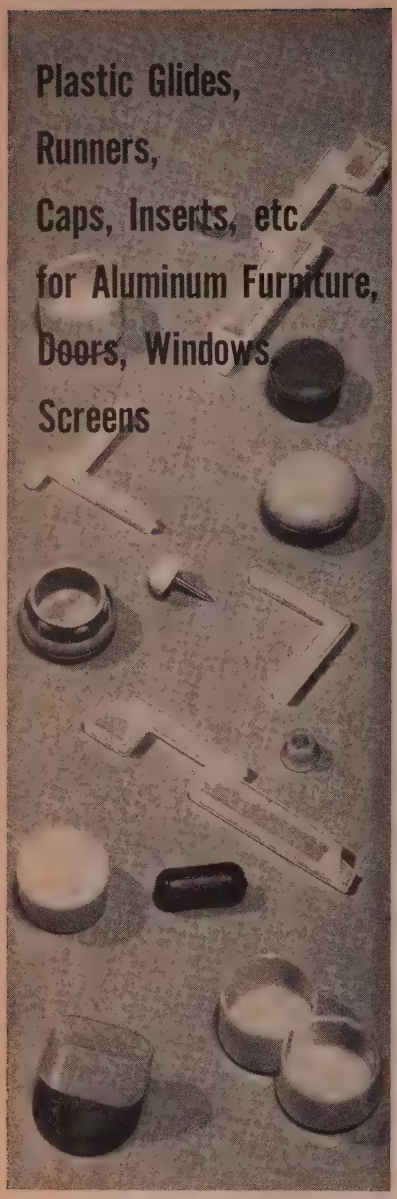

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thick, 15 inches long, 12 inches wide and 10¾ inches high.

A 47-foot, 8500 pound Air Force surface-to-air missile, the Bomarc is now in production at the Boeing Airplane Co. It is a long range area defense weapon with a large payload, which is expected to take over many fighter interceptor missions.

Among a number of Yardney Silvercel batteries used in the Air Force Atlas ICBM is a 30-volt, 60 ampere-hour unit, which supplies power during missile flight. The cylindrical AZ91 magnesium alloy case is 3/16 inch thick, 18 inches high and 9½ inches in diameter.

Casting: Cheaper, Faster

Use of magnesium alloys AZ91 and HK31A in battery cases for these four projects has given these advantages: Weight reduction; added rigidity and strength; maintenance of dimensions in duplication; easy and cheaper manufacture; and easy machining.

Magnesium cases can be cast readily, a cheaper manufacturing process than building individual cases from sheet metal. Casting also insures that measurements will be maintained in each case, and a complex, odd-size case can be made of one or perhaps two parts instead of the numerous parts that would have to be assembled in sheet metal manufacture.

In addition, magnesium allows a thicker, more workable gauge and more rigidity with little accompanying increase in volume and no added weight, as compared with other metals. For example, because magnesium has approximately one-fifth the weight and one-fourth the strength of steel, it can provide a thicker, more rigid case weighing less than a steel case of comparable strength. Furthermore, the magnesium case can be readily machined and pressure-sealed.

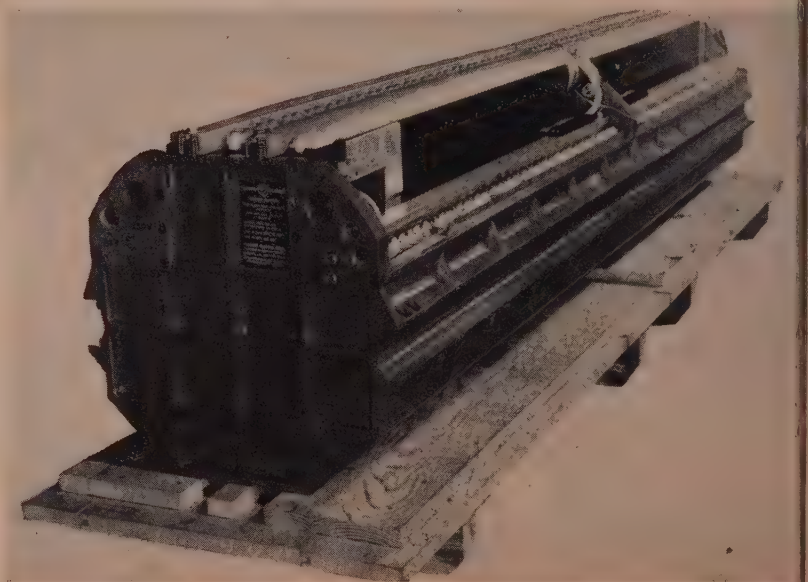
As for aluminum, its high strength-to-weight ratio makes it important where lightness counts. Since it tends to react with battery electrolyte and must be protectively coated, however, it is not used often.

In Yardney's Mark 55 torpedo battery for the Navy, the tray, hold-down and bottom rails and separating studs are made of aluminum, covered with a protective coating. The tray has a wall thickness of 1/16 inch, is 33¼ inches long, 15⅝ inches at its widest and 11-9/16 inches in overall height. It fits into a tube measuring 16-9/16 inches in diameter.

Because the tray is made of aluminum, it weighs a mere 8¼ pounds. If made of equivalent gauge steel, it would weigh approximately 20 pounds.

The Air Force Falcon further demonstrates the need for light weight components such as aluminum battery cases. This operational air-to-air missile is 6 feet long and weighs only 100 pounds. It uses a 15-volt, 3-ampere-hour Yardney Silvercel battery, encased in anodized aluminum, for telemetering in research and development tests.

For the reasons listed above, magnesium and aluminum have become important materials, both in the battery and case production stages at Yardney and in subsequent applications such as missiles and torpedoes, with their critical emphasis on dimensional accuracy, strength, light weight, and resistance to physical and chemical strains.



■ ***The Astor torpedo's high-power Silvercel battery is encased in AZ91 magnesium alloy which provides resistance to battery electrolyte, light weight, easy fabrication and machining, identical reproduction of dimensions through casting, and added strength and rigidity without added weight.***

When buying aluminum for your product...

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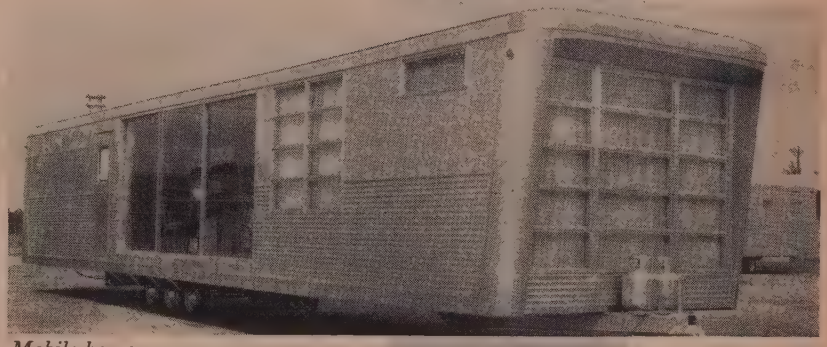
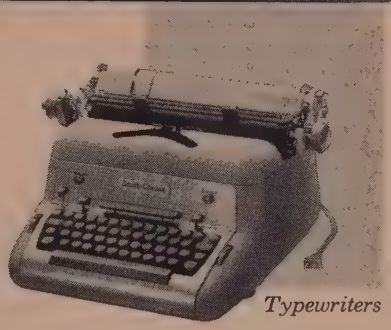


Mobile homes



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200 FEET

OF ALUMINUM ROD PER MINUTE

High speed, integrated LOMATIC line is run by one man; straightens, cold draws, cuts, and polishes 5/8-inch round aluminum rod at a rate of 3500 pounds per hour, based on 20% downtime for coil feeding and tooling changes. Superior straightness, concentricity, surface finish claimed for product. Machine can handle rounds, squares, hexagons, rectangular shapes in heat treatable, non-heat treatable alloys.

A COMPLETELY automatic high-speed machine has been developed for the continuous cold drawing, straightening, cutting and polishing of bars from coiled aluminum rod. The installation is capable of turning out high quality cold finished rounds, squares, hexagons and rectangular sections in sizes from 3/16 to 5/8 inch at line speeds of up to 200 ft. per min.

In the production of 5/8-inch rounds, this speed results in an output capacity of 3500 pounds of rod per hour, based on 20% down-time for coil feeding and tooling changes.

Designed and built by Loma Machine Mfg. Co. Inc., New York, the machine is being used in the production of both heat treatable and non-heat treatable aluminum alloys. Compared to conventional installations — separate rod drawing, straightening, polishing and cutting-to-length operations — the new single-operation machine offers the following major advantages:

1. Greater output; continuous operation at high speed.
2. Reduced labor cost; only one operator required.
3. Improved straightness; stock is straightened in two planes.
4. Perfect concentricity obtained by straight-line drawing action.
5. Higher surface finish due to two-stage polishing unit.

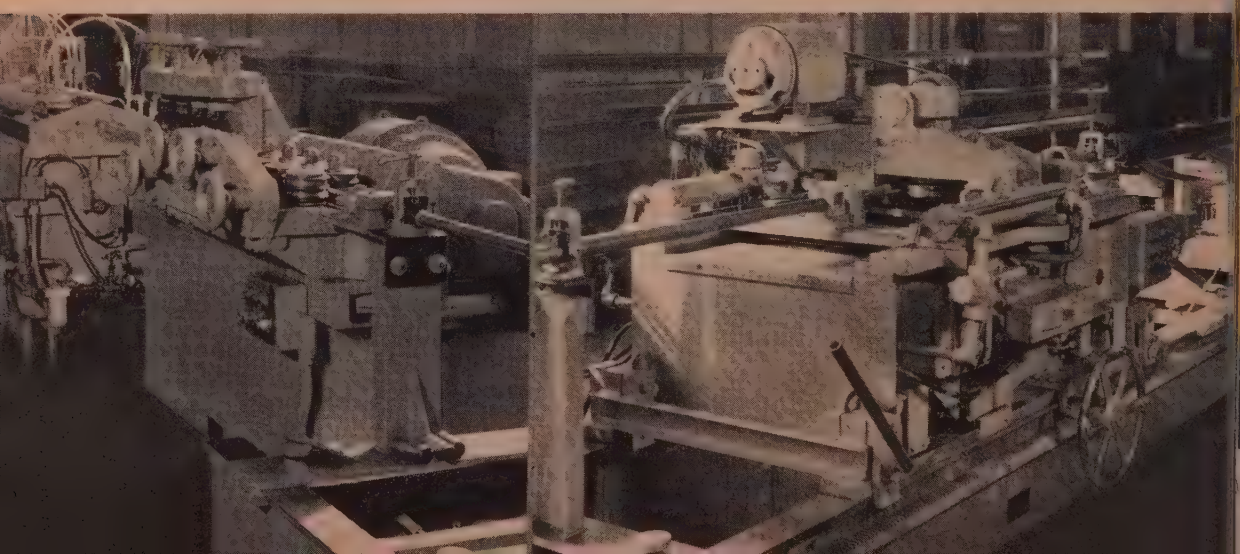
The complete line comprises an uncoiler, a prestraightener, a drawbench, a roller straightener, a flying cut-off, a polishing machine, and a discharge table. All components are interlocked mechanically and electrically into one integrated and synchronized line which is controlled by only one operator.

In a typical operation, coils of redraw rod are loaded onto the uncoiler or pay-off table and one end of each coil is pointed on either a swaging or turning machine. The machine operator has ample time during the run of a coil through the line to point the next coil without requiring the assistance of a helper.

In left photo below are shown continuous drawbench and roller straightener of the Lomatic rod processing line. Coiled rod can barely be seen in upper left corner. Controls of vertical set of straightening rollers can be seen, followed by horizontal set. Right photo shows details of flying shear, followed by polishing machine.

Why So Productive?

The high productivity of the "LOMATIC" line is largely due to its continuously operating high-speed heavy-duty drawbench, which applies a substantial cold reduction to the material prior to straightening, polishing and cut-off. The rugged design of the drawbench allows an 8000 lb. continuous pull to be exerted at 200 ft. per min. line speed. The resulting reduction greatly



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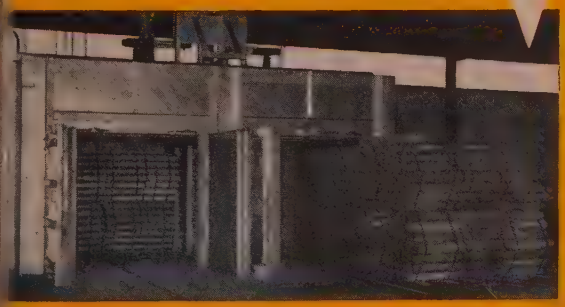
3 Simplicity of design and construction reduces erection costs and enables an oven to be relocated at a nominal cost.

4 The ability of LANLY HIGH Tem PANEL construction to withstand repeated heating and cooling reduces maintenance costs.

5 LANLY HIGH Tem PANEL construction is produced in a highly specialized industry. The result is an adequate, but not over-engineered product, produced under low overhead and profit margin conditions.

Extruders Wise Homogenize



. . . and progressive extruders may well investigate the merits of processing homogenized billets.

The advantages of homogenized billets are increased press capacity, improved extrusion quality, increased die life and reduced scrap losses.

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improves the surface quality of the stock and produces a closely held bar size, according to Loma.

The coil of rod resting on the uncoiler is inserted into the 5-roll prestraightener which removes the coil bend and eliminates any kinks. The stock is then pulled continuously through the tungsten carbide die by the back-and-forth movements of two carriages with built-in jaws effecting a reciprocating movement, so that one carriage moving forward pulls the rod through the die while the other carriage moves back.

The gripping jaws close and open automatically when the movement of the carriage is reversed, and the movements of the carriages overlap in such a way that a continuous uniform advance of the stock through the die is obtained.

The back-and-forth movement of the two carriages is controlled by cams cut into two rotating drums underneath the frame of the drawbench. These drums are operated from the main motor, which is connected to the drum shaft by a gear drive. Special provision is made for the adjustment of the carriage ways to obtain the closest possible fit, free of play.

Protecting Rod Surface

The gripping jaws built into the carriages are of great length and of a special shape so that they contact the rod from several sides and operate under a low specific pressure. This prevents marring of the material by the pulling action.

The draw die, mounted in a rigid cast iron die stand, is lodged in a die holder of spherical shape so that its position can readily be adjusted to assure the straight-line advance of the stock through the drawbench. Upon the insertion of a new coil, its pointed end is gripped by auxiliary jaws attached to the first carriage. This point may be very short since the carriage moves close to the die.

Upon emerging from the drawbench, the rod passes through a vertical, then a horizontal set of straightening rollers mounted in tandem. Each roller straightener comprises eight rollers, four of which are positively driven through gearing by a common motor.

Handwheel Adjustable

The rollers are adjustable by handwheels which actuate the adjusting screws of the roller sliding saddles. Accurately calibrated scales are provided to facilitate the exact setting of the saddles. Since the rollers are mounted on overhung shafts, they are not obscured in any way; the operator has a clear view of the stock along the entire length of the straightener. This simplifies the adjustment, operation and changing of rollers.

The rollers are made of tool steel and have ground and polished faces hardened to Rockwell C-56 minimum. Each roller is grooved to suit two sizes of stock and can quickly and easily be reversed or exchanged by loosening a nut and removing a horseshoe retaining washer.

The rod is cut into lengths ranging from 8 to 25 feet by a flying shear traveling in the direction of and at the speed of the advancing stock. The shear's two cutters are mounted opposite each other on slides in the shear carriage, which can move back and forth between guides built into the shear frame.

These slides are linked to levers in such a way that during the forward movement of the carriage, the cutters approach each other until the cut is made. After the cut, they open automatically at the end of the stroke of the carriage and remain open during the return stroke. The advance speed is synchronized with the line speed of the stock, whereas the return stroke is at a faster speed.

The shear operation is enacted by the rod hitting a length-control limit switch at the entry side of the polishing machine. The previously cut rod is taken by the polishing machine at a speed faster than the drawing speed, so that a gap is formed between any two subsequent rods.

Cut-off length is determined by the distance between the length-control limit switch and the flying shear in its rest position. This distance can be varied in accordance with the required cut-off length by moving the entire shear along its supporting bed frame.

Straightens As It Polishes

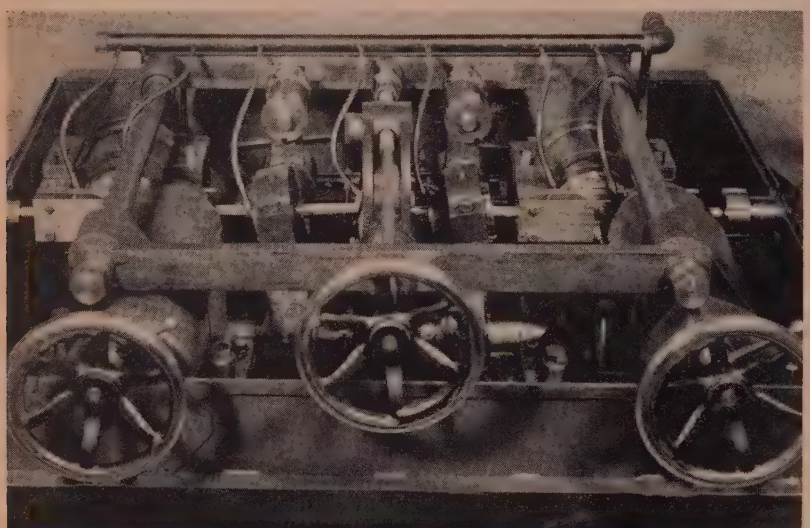
After cut-off, the stock is advanced into a combined straightening and polishing machine. It passes between two sets of motor-driven disks, disposed at the entrance and exit of the unit. The two disks of each set are mounted off-center opposite each other. They rotate in the same direction and the stock is conveyed under pressure between them.

Due to the special shape of the hardened disk surface, the rod passes at a level slightly above the center-line of the rotating disks. This results in a combined rotating and advancing movement of the stock. The high pressure to which the stock is exposed when passing between the disks produces a highly condensed and polished surface on the stock.

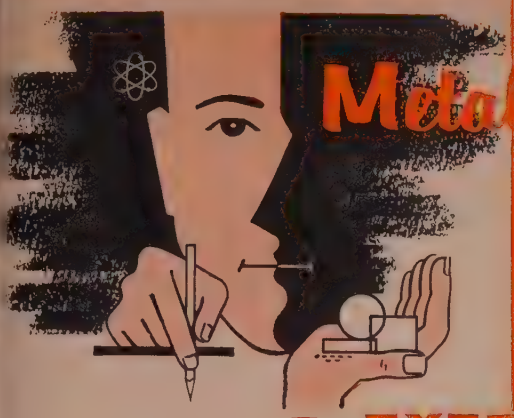
(With today's accent on greater product quality, it is becoming increasingly important for mills to be able to offer a superior surface quality as a cost-free extra.)

Simultaneously, a precision straightening effect is obtained by passage of the stock through three bushings located between the two sets of disks. These bushings are adjustable out of center and cause the spinning stock to bend in all directions, thus relieving any stresses left from the preceding drawing operation and assuring perfect straightness in the finished rod.

The finished product is discharged onto a table mounted behind the polishing machine. This table is sloped slightly towards piling racks placed alongside the table. If the rods roll freely over this slight incline into the racks, it indicates to the operator that they are perfectly straight, and that the straightener is correctly adjusted.



■ ***Internal mechanism of Lomatic rod polishing machine, the sixth element in Loma's continuous automatic drawbench and roller straightener. A precision rod straightening job is performed simultaneously with polishing.***



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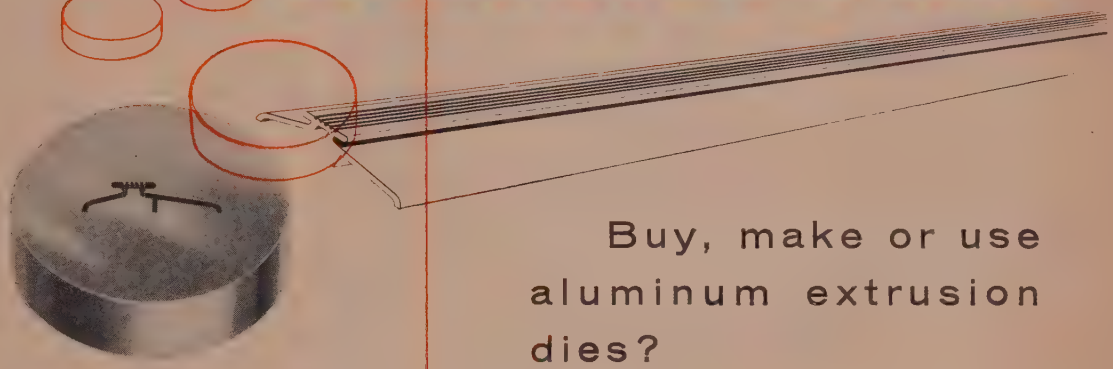

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American, European firms invest millions in

AFRICA's Booming Aluminum Industry

Huge hydroelectric power schemes, bauxite mines, alumina refineries, primary smelters to spring up in once-Dark Continent as foreign capital pours in.

PROPONENTS of an integrated aluminum industry in Africa are ignoring the worldwide abundance of production capacity and the wave of nationalistic disturbances as they move ahead full steam with their ambitious plans.

What keeps their enthusiasm at a high pitch is the presence of immense bauxite deposits adjacent to cheap water power. Also a cheap unskilled labor force is waiting to be tapped. Such obstacles as the scarcity of skilled labor, extended and arduous transportation routes and problems of distribution seem too far in the future to worry about, especially when viewed in the light of Africa's industrial future.

Inga, Belgian Congo (see map), is the center of an ambitious construction program which will produce a 1.5 million kilowatt hydroelectric generating station on the Congo River by 1965. Long range plans are for development of facilities that will generate 25 million kilowatts, equal to one-fifth of U. S. capacity.

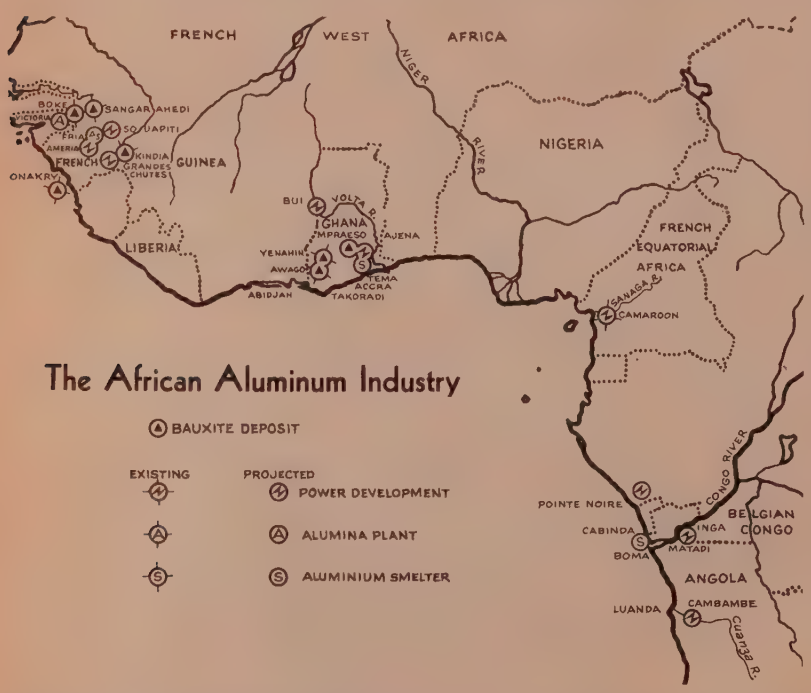
Belgian Congo officials expect this cheap power and the proximity of bauxite to cut aluminum production costs 10% under the world average. They figure 2.5 mills per k.w.h. will be the initial power cost and hope to trim this to 1.25 mills. The U. S. average cost is 2.6 mills per k.w.h.

Anticipating this cheap power and the nearby bauxite deposits, Reynolds Metals Co. and eight Belgian, Swiss, French and English firms have formed the ALUMINGA Syndicate which will survey the advantages of an aluminum production complex there.

Some 200 miles northwest of Inga in French Equatorial Africa, preliminary work has started for construction of a dam to harness the Kouilou River. Here an 820,00 kilowatt power plant will be built capable of producing 6.6 billion k.w.h. of cheap electricity annually for the support of a 250,000 tons-a-year aluminum industry. Private and French government funds are being pooled to finance this project.

In progress are studies of ways and means to build an aluminum smelter based on Kouilou River power. Participating in the company formed for this purpose by Pechiney and Ugine are Kaiser Aluminum & Chemical Corp., Olin Aluminum, Montecatini, the huge Italian industrial complex, Aluminium Limited, and the German firm, Vereinigte Aluminiumwerke.

Another activity is progressing near Douala in the Cameroons, where private French interests are expanding Africa's only going aluminum plant. The Sanaga River supplies power for the generating station here, with an installed capacity of 125,000 kw by the end of 1958. The plant's present capacity is about 45,000 tons a year, but this is to be doubled.



■ ***Most North American and overseas primary aluminum producers have been contributing to the growth of an integrated industry concentrated along the western coast of Africa. Investment in developmental work continues despite native unrest.***

Use French Alumina

Alumina for this smelting operation is being exported from France until it can be obtained from alumina plants in French West Africa. France takes the finished product.

Still further north, the government of Ghana is struggling to keep its Volta River project going. They have been forced to scale down what was originally an $850 million program involving a 200-foot, one mile-high dam across the Volta. This will create a 3000-square-mile lake and provide water power for the generation of 720,000 kw, or enough to supply a 210,000 tons-a-year aluminum industry. Financing problems have complicated Ghana's plans. While the dam hasn't been started, the government is progressing in its plan to build an artificial harbor to serve the project. Kaiser Engineers, a division of the Henry J. Kaiser Co., is surveying the Volta River project for the U. S. International Cooperation Administration.

United Kingdom smelters of British Aluminium, Ltd. have been drawing on

uxite deposits from a mine developed the company at Awaso, in southwest nana during World War II.

When Guinea declared its independ- ice of French rule they cut off the ancing of a huge generating system id smelter on the Konkoure River, at bauxite mining activity has con- nued to expand. The small country's tal ore output was about 375,000 tons 1957, largely by Bauxites du Midi, a holly-owned subsidiary of Aluminium imited, at its Los Islands (Kassa and amara) mines off the Guinea coast ear Conakry.

Bauxites du Midi was formed in 1952. ince that time the Kassa Island mine as yielded as much as 500,000 tons a ear, enough to serve 25% of Alcan's)uebec smelter requirements. A drop n demand has reduced shipments.

The French firm is continuing with its 100 million program which will create new mine capable of producing 1.5 illion tons of bauxite; a new smelter hat will produce 220,000 tons of alu- nina; and a 50-mile railroad linking ine, smelter and a new port from hich aluminum and bauxite will be hipped abroad.

Olin's Big Plans

At Fria, in Guinea, a new 480,000 ons-a-year alumina plant will feed on he huge bauxite deposits in this area. The smelter will eventually be expand- ed to 1 million tons capacity. Olin Mathieson Chemical Corp. is a partner with four European companies in this activity and will have the right to more han half the plant's output.

Last month Olin bought International Cooperation Administration guarantees against expropriation of the project by the Guinea government. All told, Olin and Omaf Corp., a wholly-owned subsidiary, paid some $72 million covering its proposed $19.8 million capital investment in Compagnie International pour la Production de l'Alumine (FRIA), the loans Omaf may make the firm as well as interim financing which the Olin Mathieson group makes before the Omaf loans are carried through.

In this way, ICA, which administers the U. S. economic aid program, promises that the U. S. will pay any loss suffered by Olin through expropriation of the fruits of its investment.

Cheap labor and electric power, combined with close-by bauxite deposits which are practically inexhaustible, make a formula for low-priced alumina which in five to 10 years is bound to have a strong impact on the North American aluminum industry. No wonder, then, that the five big producers in this hemisphere are putting some of their resources to work in what was once called "The Dark Continent."

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OLIN ALUMINUM

OLIN AND "OLIN ALUMINUM" ARE TRADEMARKS

IN 'PROJECT COST-TRIMMING'

Rockwell did it with Die Castings

Expanding production of meters, regulators, valves, power tools, and other products in Rockwell's line poses problems that are being solved by switching all possible parts to aluminum die castings. Machining costs reduced by 'low-cost automation.'

TAKE the ever-rising cost of staying in business, add a stable of 19 metal product lines encompassing 25,000 sizes and types, and you have the makings of a business situation harrowing enough to cause sleepless nights for any management group.

Finding itself in this unenviable position in 1951, Rockwell Mfg. Co., Pittsburgh, Pa., manufacturer of valves and metering devices, began a research and development program for systematic review of its product engineering. Object: To determine new uses of aluminum. Uses discovered among the firm's long list of products also revealed the desirability of die casting, and led to construction of a large plant solely for this purpose.

Located at Russellville, Ky., the plant was laid out and equipped for efficient volume production and rapid expansion as Rockwell's use of aluminum grows.

Rockwell reports that it was the first manufacturer to use aluminum in gas meters and regulators and now uses the metal exclusively for these products. The list of aluminum components in Rockwell's meters, power tools, valves, taxi meters, and other products lengthens almost daily.

In most cases where Rockwell substituted aluminum for other metals these substitutions were the result of general efforts to cut costs and improve products without increasing prices. Lighter weight reduces shipping and handling costs and makes products easier to handle. Light weight is particularly important in meters which are installed in gas lines with little or no supplementary support. Corrosion resistance of aluminum meter cases makes it practicable to install them anywhere without protection from the weather. Easier machining of aluminum cuts manufacturing costs.

The new plant now casts more than a hundred different components for Rockwell's meters, valves, power tools, and other products assembled in other company plants.

Facilities at Russellville can melt and cast up to 5000 pounds of aluminum per hour. Castings range in size up to 21 pounds, one of the largest pressure aluminum die castings made. As a foundry, the plant is unusual in that all castings are machined before shipping. This reduces handling, inventory, floor space, and shipping costs. About 155 employees work at the plant.

The entire setup for melting aluminum, delivering it to die casting machines, and returning imperfect castings to the furnaces is so nearly automated that one operator performs all the work. The largest of the 12 die casting machines is automatically fed.

Most of the castings are finished on special drill press setups that perform several operations, including milling and tapping, simultaneously or in sequence. Rockwell, which makes Delta drill presses and other light weight machine tools, calls these setups "low-cost automation" — the combination of one or more low-cost tools with automatic fixturing and controlling devices.

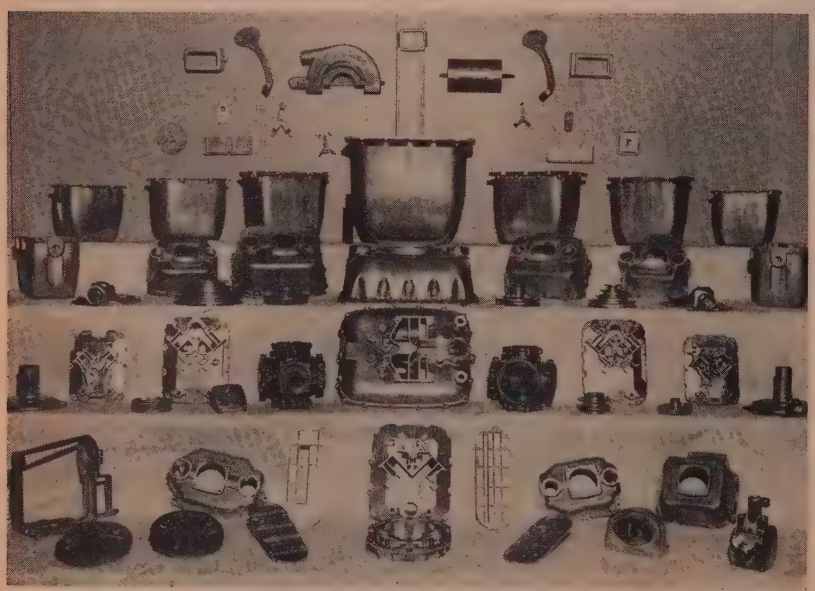
The building is a T-shaped structure with the foundry in the leg of the "T" and the machine department at the top. At one end of the foundry is the furnace room. Three Ajax electric induction furnaces of 1000 pounds capacity each are imbedded in the foundry floor and there is space for three more in the same line.

Alloys used are 380, 13 and 218. The plant does its own alloying, buying primary ingot from the producers, secondary metal from such smelters as Apex Smelting Co., Alloys & Chemicals, Inc., and others, and purchasing scrap from outside sources.

"In purchasing secondary, we buy strictly on price," a Rockwell executive said. "We also try to have at least 100,000 pounds of primary on order each quarter."

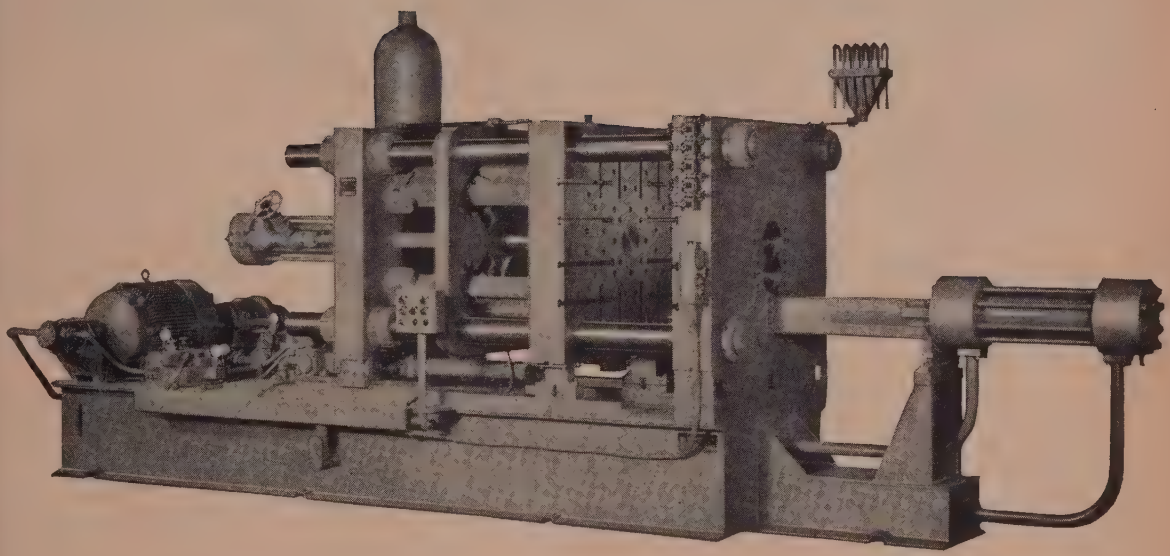
Furnaces are emptied into a bull ladle which is handled by a crane running the entire length of the 275 foot long foundry area. The man who charges the furnace also operates the crane car and delivers the molten metal to the 12 Lester die casting machines which range from 400 to 1000 tons.

The largest machine—it casts the 21 pound meter body—is equipped with an Ajaxomatic automatic ladling furnace which can deliver up to 35 pounds of aluminum per shot. The die casting



A display of Rockwell Mfg. Co. shows the variety of aluminum product parts die cast by the firm at its Russellville, Ky. plant.

GREENLEE BROS. & CO. has purchased the well-known B&T MACHINERY COMPANY and entered the die casting machine field



PRODUCTION MACHINERY
GREENLEE

The B & T Machinery Company, well-known manufacturer of die casting machines for zinc and aluminum, is now a division of Greenlee Bros. & Co., Rockford, Illinois.

The strength of Greenlee production facilities, Greenlee cooperative engineering and Greenlee sales and service engineers, is now combined with the personnel and facilities of the B & T Machinery Company.

B & T die casting machines and hydraulic trim presses will be sold and serviced through the Holland, Michigan plant with the assistance of the national Greenlee sales organization.

B&T MACHINERY COMPANY

A DIVISION OF GREENLEE BROS. & CO., ROCKFORD, ILLINOIS

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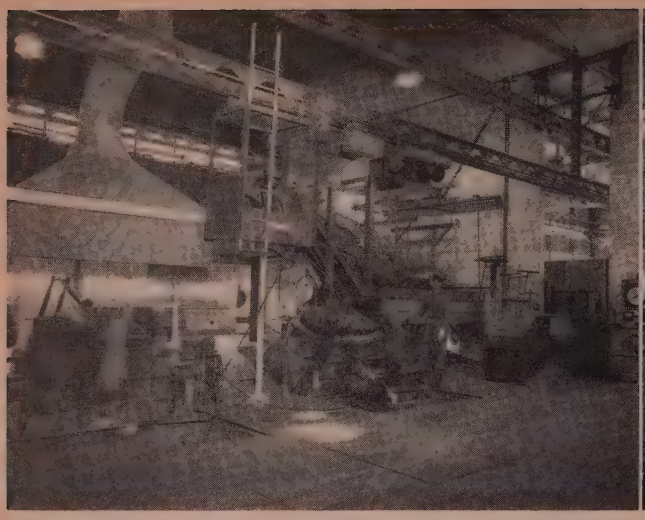

■ *One man handles all operations in the preparation of raw aluminum stock—from charging and controlling furnaces (left), to loading bull ladle, delivering hot metal to die casting machines, and returning scrap to furnaces. Right photo shows arrangement of die casting machines on both sides of a catwalk and overhead crane line. Bull ladle (arrow) is distributing metal to the die casting machine metal pots.*

machine has 900 tons locking pressure with one-ton oil pressure, a maximum pressure on the metal of 33,200 psi. Its output is 50 pieces per hour.

Room for 8 More Machines

There are six machines, each with its own hydraulic system and its own Ajax holding furnace (20 KW) on either side of the crane line. Space has been provided for eight more machines along the line. Die casting machine operators inspect each finished piece and place them on a conveyor which runs under a catwalk between the two rows of machines. Castings are then placed on pallets at the end of the line.

Pieces rejected in inspection are placed on the lower level of the conveyor belt which carries them back to the furnace room. Here, they are channeled 90 degrees onto an ascending conveyor which carries them behind the furnaces.

Scrap is stored either on the ascending conveyor or in two weighing hoppers suspended above it which may be lowered so that rejects from the conveyor fill them automatically. Rejects are returned to the furnace from this storage point by an extending conveyor which is directed into the furnace to be charged.

Current Russellville volume doesn't merit full-scale automation. As a substitute, Russellville tool men have devised setups that combine operations. There is no transfer mechanism or feed back in these setups as in a full-scale automation machine, but multiple operations are performed in which the operator's duties are limited to loading, unloading and actuating the cycle.

These setups seem ingenious, yet they are made from simple, standard drill press components. One setup is simply an L-shaped row of 6 presses equipped with special tooling to drill and tap 17 holes in a part at the rate of 151 parts per hour. The part is a valve plate.

In another setup, a four spindle drill press production line drills and taps holes in top and side of meter covers. All four tools are controlled by foot-operated pneumatic feed devices so that the operator simply loads and unloads. Two spindles drill and tap four holes in 272 pieces per hour.

In the other two-tool setup, one spindle drills 12 holes while the second taps 8 in 194 pieces per hour. Similar setups throughout the machine department permit low cost finishing of castings in small lots.

■ *Surrounded by tiers of die cast aluminum products, operator does a simple grinding job on a Rockwell meter cover. She's using a six-inch abrasive belt finishing machine, uses press at right to stamp bolt holes.*

The drill press setups used at Russellville permit Rockwell to set aside special machines for work done in very small lots. Capital investment is small enough that the setups can stand idle most of the time without waste of capital. Because they are designed to combine several operations, to eliminate excessive handling between operations, and to limit work content to loading and unloading, they are several times more productive than work on individual tools.

Plan More Automation

Russellville's tooling men have become experts in "low cost automation." Only work on the smallest, most infrequently run lots is done on individual tools. Even where individual tools are used, they may be in special setups. For example, drill presses are frequently used for spotfacing large surfaces up to 3 inches in diameter.

Although Russellville's drill press setups are paying off handsomely for Rockwell, management doesn't consider it the final answer. Work now done on the drill press setups may be put on completely automated lines when volume justifies it.

All of the 100 parts cast at Russellville could be finished in completely automated machines and Rockwell management is prepared to convert to automation on any component when volume will justify the investment.

Current plans envision a plant layout in which major castings, now moved on pallets, are conveyorized from casting machines directly to automated machines in the machining department where multiple machining operations and inspection will be accomplished without additional handling.

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*Twenty-six years a communicator of new progress in metal, William F. Gilligan—salesman for Alcoa distributor Whitehead Metals, Inc., of New York City—is typical of the men who make their careers service to industry, through knowledge of aluminum!

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TITANIUM vs. STAINLESS IN CHEMICAL PROCESSING EQUIPMENT

Even in using a highly conservative life expectancy factor for titanium compared with stainless steel, the latter material is found to be considerably more expensive, General Electric Co. reports.

by R. W. Wirta, General Electric Co.
Hanford Atomic Products Operation, Richland, Wash.

TITANIUM possesses two outstanding characteristics: High strength to weight ratio, and relatively high corrosion resistance. These characteristics explain its rapid growth from a laboratory curiosity to a construction material for which there is a demand of more than 25,000 tons a year.

The metal's high strength-to-weight ratio has been exploited by the aircraft people who, with the Defense Department, brought titanium from the laboratory to the production line. Without this help, the chemical industry might have been hard put to justify titanium's tremendous development costs.

The benefits to our industry, however, lie in titanium's relatively high resistance to many of the chemical industry's corrosive environments.

Just how corrosion resistant is titanium? There are almost as many answers as there are applications. A convenient comparison may be drawn by examining the corrosion resistance of commercially pure titanium with that of chromium-nickel austenitic (18-8) stainless steel.

On the basis of the standard Huey test (boiling 65% nitric acid) most sources will agree that the corrosion of titanium is about one-tenth that of stainless steel. The corrosion rate of titanium in boiling aqua regia is around one five-thousandth that of stainless steel. In an aqueous system, so long as an oxidizing agent is present, the corrosion resistance of titanium is significantly superior to that of stainless steel.

Why, then, is titanium not used exclusively in place of stainless steel? The answer is simple: The technology of titanium and an understanding of its economic justification are too new. The metal was first put on the market in commercial quantities in 1948, but it wasn't until 1952 that enough of the material was produced for civilian consumption. In these few years, titanium has emerged as a construction material with attractive economic incentives.

These incentives are complex and vary widely from one application to another. For the chemical industry — or any other industry — factors such as the specific process requirements, initial equipment cost, amortization rate, maintenance, service life, and plant shut-down costs are but a few of the elements affecting the choice of materials.

The general complexities of the chemical industry are compounded many fold in the nuclear chemical processing field. For example, contract maintenance, repair and return to service — or even the examination of a failed component, are often impossible. Thus, the necessary consideration for remotability, preparation for the replacement of a component, the disposal of a spent component, and plant shut-down time constitute a significant portion of the over-all costs.

Consider, for example, some dollars-and-cents aspects of replacing stainless steel with titanium for a given critical application. The pound-for-pound cost of titanium mill products averages about seven times that of stainless steel. However, substituting titanium for stainless steel is done on a volume basis. Because the density of titanium is less than 60% that of stainless, the material cost of titanium is about four times that of stainless steel.

For nonrepetitive special type fabrication, the costs are about doubled when titanium is substituted for stainless. The corrosion resistance of stainless is about one-tenth that of titanium. How do these numbers look in a nuclear chemical processing cell? For a conservative evaluation of this, assume the following four factors for a $250,000 installation made of stainless steel:

1. Cost of material, titanium vs. stainless = 4.0
2. Fabrication cost, titanium vs. stainless = 2.0
3. Life expectancy factor, titanium vs. stainless = 5.0
4. Process permits the use of 75% stainless and 25% titanium.

Study the cost breakdown shown on page 80. It includes only the initial cost for the equipment and does not factor in other important elements such as plant shut-down time, decontamination, and disposal of failed equipment.

The first column shows a typical cost

■ *G.E. welding experts improvised to produce an inert gas blanket in this titanium patch welding job. Left photo shows some of the details described in the article; right photo shows patch partially completed.*

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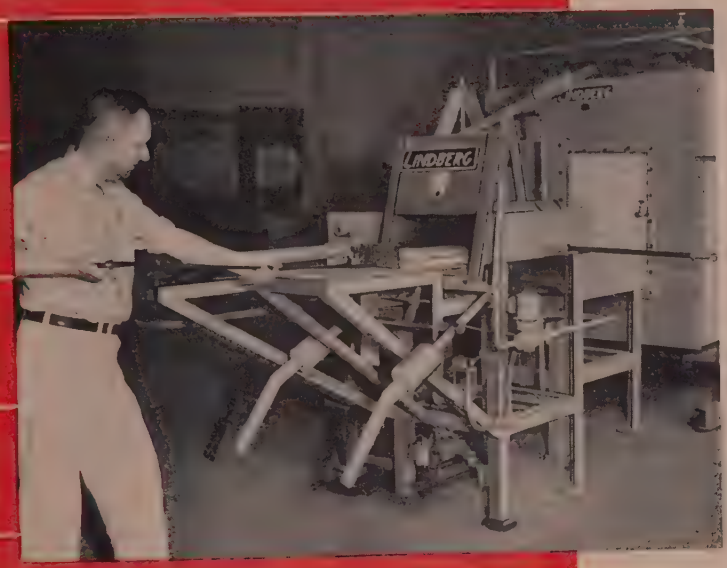
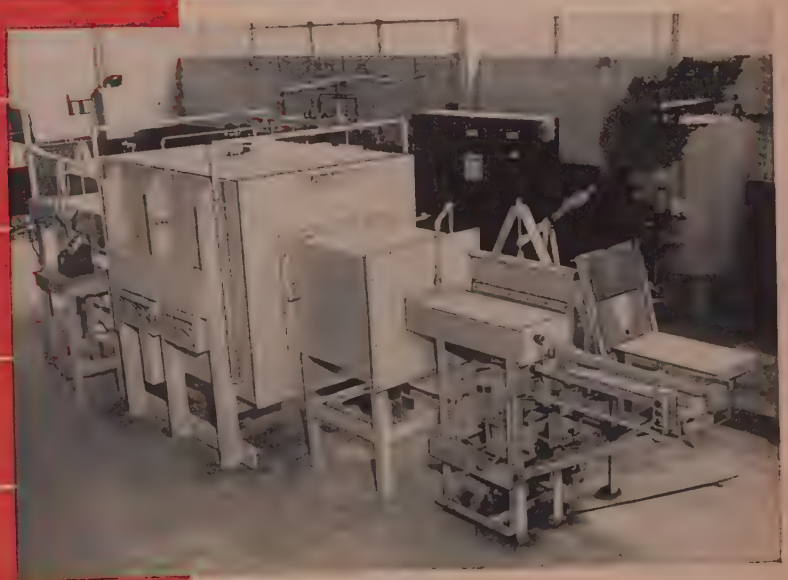


A new Lindberg development, this Molybdenum Element Atmosphere Pusher Furnace is designed with high temperature refractories suitable for low dew point without need for a muffle. It is now being used for sintering stainless steel compacts in hydrogen or dissociated ammonia. Ammonia dissociator and control panels are shown at the right of the furnace below. In this installation hydrogen supply cylinders are located outside the building. Furnace provides side loading and discharge ports with purging chambers. Work trays, ceramic slabs or molybdenum boats, move through the furnace by hydraulic pusher. If you have a sintering or brazing problem why not talk it over with Lindberg. Just get in touch with your nearest Lindberg Field Representative or write us direct. Lindberg Engineering Company, 2446 West Hubbard Street, Chicago 12, Illinois.



Type MOP-12307-A60C Molybdenum Element Atmosphere Pusher Furnace. Maximum Temperature 3000° F. 60 KW input. 12' wide, 30' long, 7' high. 60' cooling chamber, 35' long preheat chamber.

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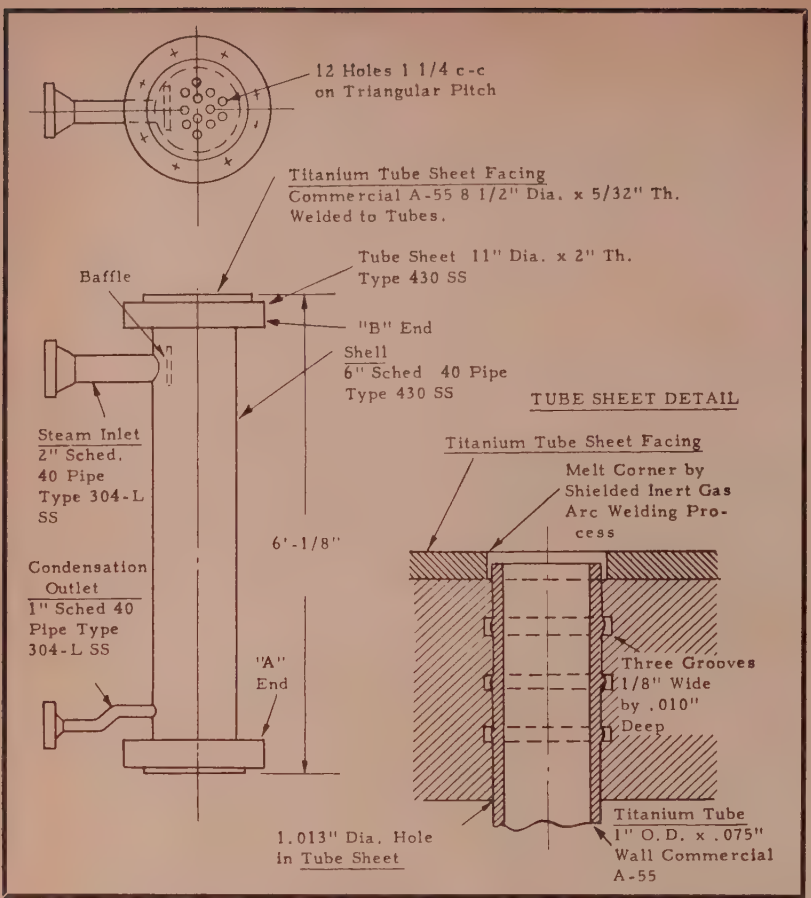

■ *Fig. 1. Design of this heat exchanger called for a combination of titanium and Type 430 stainless to reduce cost. Used as a product concentrator in a concentrated nitric acid stream at Hanford Laboratories, this titanium tube bundle has outlasted stainless tube bundles by a factor of seven to date.*

breakdown for equipping a cell at Hanford Atomic Products Operation of General Electric Co. at Richland, Wash. The second column shows that the original cost, utilizing titanium for 25% of the components, is 29% more than that for stainless steel. On the other hand, using an extremely conservative life expectancy factor of five, the third column shows that, in the long run, the stainless steel installation costs 36% more than the judicious combination of titanium and stainless. Think of the respective values if a life expectancy factor of *ten* were used!

By a simple analysis of a particular situation, the incentive to employ some rather exotic construction materials readily becomes evident. In today's nuclear chemical processing field, titanium need not be considered an exotic material.

At Hanford, the superiority of commercially pure titanium over 18-8 stainless has been demonstrated in a number of instances. For example, a prototype titanium tube heat exchanger was fabricated for use as a product concentrator in a concentrated nitric acid stream. This tube bundle has, to date, outlasted stainless tube bundles by a factor of almost seven.

Design of this heat exchanger (Figure 1) called for a combination of titanium and Type 430 stainless in order to reduce cost. It is a tube and shell design, with process material flowing through the titanium tubes and steam through the stainless steel shell.

Type 430 stainless steel was chosen to more nearly match the thermal coefficient of expansion of the titanium and to achieve adequate resistance to possible nitric acid vapors in the operating atmosphere.

Titanium tubes and tube sheet facings were used to provide a titanium heat transfer surface exposed to the corrosive process solutions. The titanium tubes were rolled into the stainless tube sheets for mechanical strength; fusion welds were used to join the titanium tubes to the titanium sheet facings to form an uninterrupted surface exposed to the process steam (see Figure 2).

Another interesting titanium application arose recently in experimental dissolution studies in which stainless steel jackets were removed from simulated spent power reactor fuel elements. The process selected for the dissolution of the stainless steel utilized boiling dilute aqua regia.

From the numerous materials considered, titanium was selected because it was economically most attractive. The experimental pilot plant equipment included a 200-gallon dissolver tank, a 200-gallon acid receiver tank, condenser, jets, valves, and interconnecting piping. If the feasibility of this process is demonstrated by the pilot plant, the design of actual service equipment would be similar but on a scale of 5000 rather than 200-gallon capacity.

On Site Welding

The fabrication of this equipment helped us in developing field welding techniques. The term field welding is used in its literal sense because much of the welding was done on location. No dry boxes, expensive fixtures, or conventional trailing gas shields were used.

The prime consideration in welding titanium is the exclusion of air and water vapor. Molten titanium has a tremendous affinity for oxygen, hydrogen, nitrogen and carbon. Only a small amount of these elements absorbed in titanium renders the metal useless through embrittlement. An embrittled weld frequently cracks because the metal is not ductile enough to yield under the thermal stresses introduced by the welding operation. Such embrittled metal cannot be repaired by rewelding but must be completely removed by chipling or grinding.

Much of the literature on the welding of titanium describes economical production set-ups for repetitive operations which justify the use of elaborate inert gas shielding devices. This approach is not completely applicable in the fabrication of chemical processing

	Initial cost all stainless	Initial cost 25% titanium 75% stainless	Cost with 5 replacement of 25% of stainless
Fab'n + O'head	$140,000	$175,000	$280,000
Materials	50,000	87,500	99,500
Installation	25,000	25,000	25,000
Eng. & Admin.	35,000	35,000	35,000
	$250,000	$322,500	$439,500

Cells without bars

The aluminum furnace cells at the Stalinsk reduction plant in the Kuznetsk basin of Siberia are tended by men in servitude. There are bars around the cells, their jobs, their lives. To subvert and disrupt the economy of the West, Russia is dumping this slave produced metal in the European markets—knowing full well that economic warfare is deadlier than missiles.

European producers, pushed out of their markets, in turn are dumping aluminum into the United States. By then the cycle is completed and the Russian economic warfare is in full swing. It is hard to believe that the unwary purchaser of European metal is indirectly subsidizing Communist economic warfare.

The aluminum electrolytic cells at our Oregon reduction plant are tended by men of all faiths and origins. They work with opportunity, without fear or prejudice. There are no bars around the cells. The metal they produce is used to strengthen the economy of the United States.

Let us be thankful that in America we still have cells without bars . . . cells that bolster our economic existence. Be outspoken enough to perpetuate this heritage.

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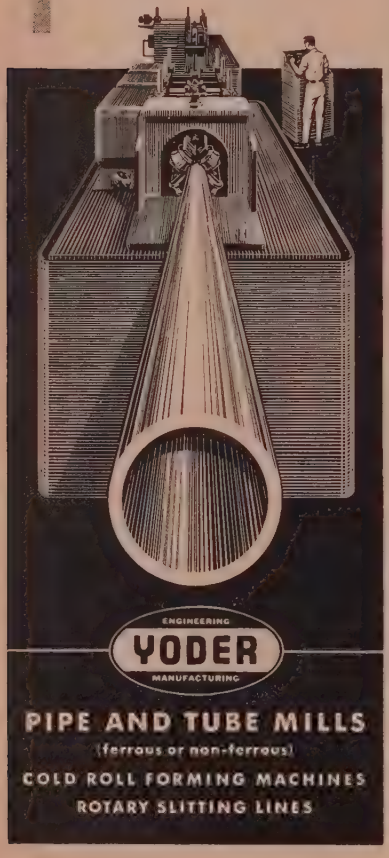

■ ***Fig. 2. Fusion welds were used to join the titanium tubes to the titanium sheet facings to form an uninterrupted surface which is exposed to the process steam.***

equipment, however, because almost each welding operation is different from the next.

Some of the improvised techniques used to achieve satisfactory inert gas blanketing over the weld area are illustrated. Figure 3 shows a setup for welding flanges to tubing. Plywood and sheet metal were used to cut down cross drafts. The sheet metal cone served as a diffuser to provide a non-turbulent gas blanket over the fusion weld while a small laboratory blower served to draw some of the gas down through the tube.

Welding Improvisation

Mild steel pieces were clamped to the flange to give support during welding and to draw out the generated heat. The diffuser cone was also used at other similar applications where a small local area required gas blanketing.

One photo on page 78 shows a welding setup to install a patch in the titanium dissolver tank. Because of a change in requirements, it was necessary to change the size of pipe welded into the tank. This patch was applied to fill the resultant hole. The other photo shows the patch partially welded into place.

Note the sheet metal device used to provide the inert gas blanket on the front side. Not shown is a small sheet metal box attached with masking tape to the inside of the dissolver tank to provide an inert gas purge on the back side of the weld.

In use of the gas distributor shown in this photo, inert gas is introduced from a hose, through a valve to two sheet metal boxes, each about the size and shape of a cigar box. Each box contains a fine metal screen near the middle to reduce turbulence and channeling of the gas. The open portion between boxes is positioned to straddle a butt or corner seam. This opening also provides access for the welding operations.

Masking tape is sometimes used to help localize and direct the flow of inert gas. This gas distributor cannot be used in welding small diameter pipe, but a piece of ⅝-inch tubing has been used successfully to direct the gas upon the front side of the weld while a gentle flow of inert gas was passed through the inside of the pipe for back side blanketing.

These illustrations show how titanium can be successfully welded in the field. The devices by no means illustrate the ultimate on the subject, but they show how inexpensive gadgets may be improvised to do the job.

Men learn quickly through experience and take pride in being able to "jury-rig" devices for specific applications once they understand the two basic tenets for welding titanium:

1. The surfaces to be welded and filler metal must be perfectly clean.
2. Air and moisture must be completely excluded from molten titanium.

The surfaces to be welded, as well as any filler rod, must be devoid of dirt, oxides, and oil or grease to assure that no carbon is carried into the weld metal. Air must be excluded from both the front and back faces of the weld with a non-turbulent blanket of inert gas such as argon or helium or a mixture of both. This blanket must be maintained until the metal cools to at least 1000° F.

Titanium has won a place in the chemical processing equipment field. It can serve a very useful purpose to reduce costs in numerous applications as well as make way for new processes heretofore considered impractical because of the limitations of certain materials.

Having hurdled the barriers of fabrication, there is little reason to exclude titanium as a construction material for numerous potential applications in the field of chemical processing.

■ ***Fig. 3. At the Hanford operation, G.E. welding techniques achieve an effective inert gas blanket over a titanium weld area. Equipment included the sheet metal cone which served as a diffuser to provide a non-turbulent gas blanket.***

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■ *Several applications of anodized aluminum, both external and internal, can be seen in this night-time view of the main entrance to Northern Aluminium Co.'s new Rogerstone office building.*

New Face for NORAL Plant

Modern Offices for Northern Aluminium's Rogerstone works raise efficiency and morale of administrative staffs. Aluminum used extensively inside and out.

OFFICE facilities of most growing industrial firms too often take a back seat as, year after year, expansion and improvement capital is devoted to the development of production facilities. But it's a rare office that doesn't eventually earn new accommodations after plant expansion has leveled off.

Such was the case at the Rogerstone rolling mills and extrusion plant of Northern Aluminium Co., Ltd., in England. Since the begining of the year, however, a modern office block makes a striking addition to the properties. And as might be expected, aluminum was used extensively in construction of the office building.

The plant is ideally situated in that it occupies ground close to the transport facilities associated with an industrial area, yet near enough to unspoiled countryside to allow reasonably spacious location of buildings.

The new office building stands open to the public road to Newport, outside the works perimeter. From road level the site slopes down about ten feet, and this feature has been utilized to give two ground floor levels. On the side of the building facing the works, parking space for vehicles is provided.

In the past, the various departments — managerial, material and plant control, engineering design, personnel, and others — have been housed in separate office buildings, scattered over the works area as a result of wartime planning. These are now concentrated in the one building.

The inter-relation of many activities also had to be considered, and provision had to be made for the specialized requirements of certain departments. Besides meeting these needs, the building was designed to permit future re-arrangement, and provision was made for possible expansion to the southeast, to add another 10,000 sq. ft. to the present 50,000 sq. ft. of floor space.

The four-story building is in the form of a rectangular block about 250 ft. long and 45 ft. wide. The offices are arranged in three of the main floors, with a lower ground floor to the rear of the site in addition. Surmounting the building is a penthouse containing a dining room and lounge, used for entertaining customers and visitors. A passenger elevator finished with panels of satin-anodized natural-colored aluminum rises close to the central stairway.

Aluminum curtain wall panels made up in 8 ft., 4 in.-wide continuous vertical units comprise the principal facing material. The elements of these panels are 4-ft. wide double hung sash windows with frames of Noral 50S alloy, and reeded aluminum spandrels composed of special extruded sections placed between each window sill and the head of the window below.

The spandrels are of anodized Noral 33S alloy. When anodized, this alloy takes on a natural warm gray finish without the use of dyes. Casings for the nibs of the columns (forming the mullions), and cover fillets at the junction of the windows, are also of aluminum.

At the ends of the front and rear elevations, broad vertical panels of buff-colored brickwork are introduced, both to avoid too metallic an appearance in the building and to provide wind bracing. Flashing for the roof coping is of Noral 3S alloy.

Within the building, office accommodations are formed by patented movable, glazed aluminum partitions. The columns and trim of these partitions are of Noral 50S and B51S alloys. Ceilings are of acoustic tiles, and most floors are of cork tile.

Attractive Main Entrance

Aluminum alloys 50S and B51S are also used in the cantilevered canopy over the main entrance; for framing the large sliding glass doors of the penthouse; and for details such as push-plates on doors, kick-plates, and switch-plates. Balustrades and external handrailing are of anodized 50S alloy, with castings of Noral 165A.

Special requirements dictated the choice of materials for the lower ground floor rooms: The floor of the test house is of wood blocks, and the chemicals laboratory has tiled walls. Floors in the laboratories are of terrazzo tiles with expansion joints made of Noral 51S.

■ *The new office building has aluminum and curtain walls for the main decorative treatment, relieved by brickwork at both ends. Interior decor also makes good use of aluminum.*

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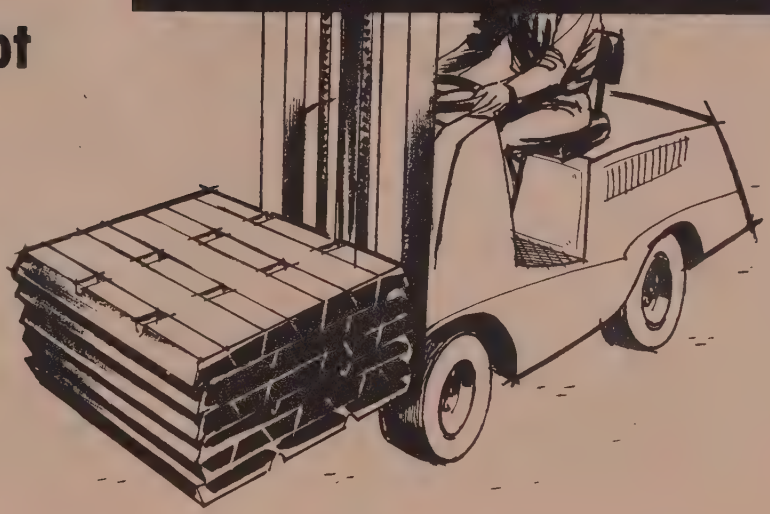

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Magnesium in Airborne Photo Gear

by M. J. Mraz, Production Engineer
and
C. Ellman, Project Engineer
Chicago Aerial Industries, Inc.
Melrose Park, Ill.

Increasing size, range and complexity of aerial reconnaissance equipment places big priority on weight trimming. Magnesium, usually in the form of castings, has become a star performer. Paper given at the last Magnesium Association Meeting details the experience of one major supplier.

MUCH progress has been achieved in the use of magnesium in military photographic equipment manufactured by Chicago Aerial Industries. Magnesium — particularly in the form of castings — has solved many of the complex problems involved in the design and construction of both airborne and ground-based photographic equipment.

The most significant problem in designing airborne equipment is the need for low weight. Every additional ounce of equipment carried by the airplane requires an increased fuel load and results in a decreased radius of action. Since the photographic pilot's defense is based upon having a faster airplane than his enemy, it is the custom to eliminate armament from most reconnaissance aircraft. In addition, any reduction in the weight of photographic equipment helps increase the radius of operation and the probability of a successful mission. Magnesium castings are instrumental in keeping the weight of photographic equipment to a minimum.

A second need for light weight arises from the fact that personnel must install or remove interchangeable parts from the reconnaissance plane. Film magazines and cassettes are removed from the cameras after each reconnaissance flight so that the film can be processed. And sometimes a different camera must be installed to provide increased photographic coverage.

Depending upon their size, cameras weigh from 35 to 75 pounds. Film magazines and cassettes vary from one to 20 pounds, and viewfinders range from 35 to 115 pounds. By the extensive use of magnesium, these cameras and accessories can be kept low in weight even though their electrical, optical and mechanical parts may be very heavy.

The photographic equipment installed in a typical reconnaissance aircraft is shown in Figure 1. There are also stabilized camera mounts, pyrotechnic flares flash bombs, dehydrator units, 5000-feet of electrical wiring, and the additional aircraft structure required to mount this equipment. The photographic component in Figure 1 which uses the most magnesium castings is the viewfinder. It is made up of 42 individual castings.

The viewfinder body has undergone a typical evolution over the past nine years. In 1949, when we were designing the VF-3, our first binocular viewfinder, we had to be satisfied with a ¼-inch plus wall and heavy reinforcing ribs. The following year an attempt was made to reduce wall thickness and unit weight by constructing a magnesium weldment of ¼-inch plate, but the additional grinding, machining and testing required to provide a dust and light tight package made this method uneconomical and impractical.

Magnesium castings provided the best answer to our problems. Continual development over a six-year period has resulted in envelope castings with only a ⅛-inch wall thickness. This substantial reduction was brought about through close liaison between the patternmaker, the foundry and our engineering.

A typical viewfinder body envelope, largest of the viewfinder castings, is shown in Figure 2. Its irregular shape is necessary to provide clearance between the viewfinder and aircraft structure or adjacent equipment. The casting wall thickness is only ⅛-inch; rigidity is obtained from the interconnecting ribs between the mounting bosses and along the walls, and from the cast side corners and the flange along the top. The overall rigidity is attested to by the ability to hold interior machined bosses to height tolerances of less than ±.001".

To produce castings having a high tensile strength and minimum distortion, we used AZ 63 or AZ 91 magnesium alloys. The latter is used in the large viewfinder casting because of its hardness, pressure tightness, good ductility and excellent foundry characteristics. To maintain dimensional stability

rd assure maximum strength, these rge castings are heat treated and aged ior to machining.

Most of the small internal castings ve adequate dimensional stability in e as-cast and stabilized condition. Fedal specification QQ-M-56 is our govning quality standard.

The presence of airframe structure ten requires that a large volume piece equipment be assembled after it is in lace. Precise dowel pinning and acurately machined flanges between matıg parts are required to maintain optial alignment. For a high acuity terrain iewer, limiting casting size to a maxiıum length of 30 inches facilitates both asting and machining. When larger enelopes are required, several castings are olted and pinned together.

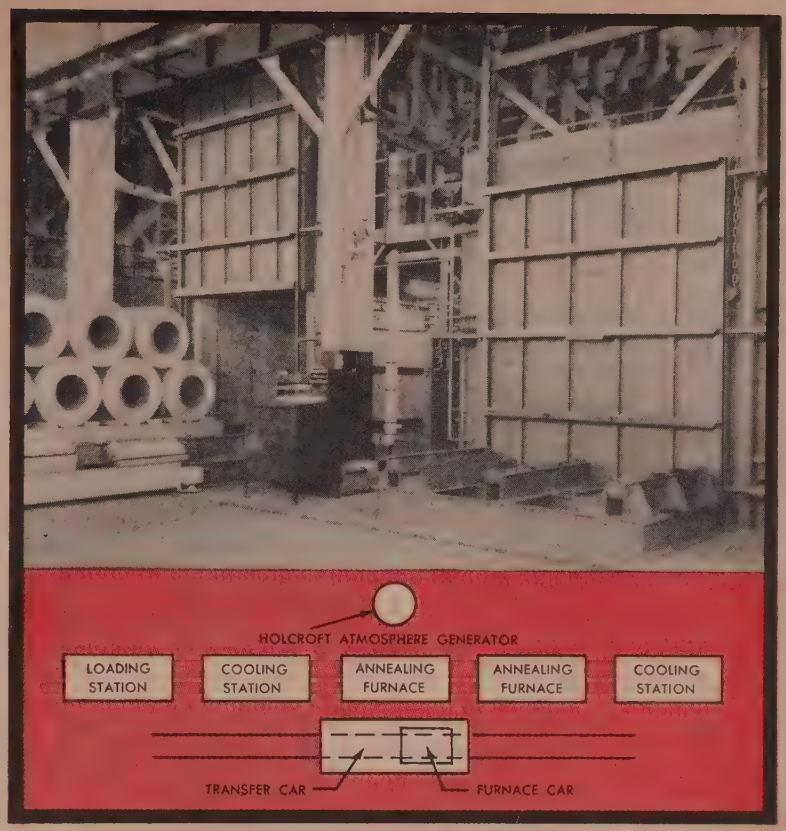
In many cases, such as an eye lens ousing, boring and thread cutting nust be done on a portion of the castng furthest from the mounting flange. The rigidity of magnesium and its ease of machining make it possible to perorm this type of operation on relatively large castings with usual tools.

Magnesium tubing is often used to roduce lens retaining rings and simiar cylindrical items. The machineability of magnesium tubing is demontrated in a 4¾-inch lens separator ring which is machined until its wall thickness is only .025-inch. Many times, due o the unavailability of thick wall tubng, castings are used. While care must e taken in machining and clamping rings of this type, the familiarity of hop personnel with the standard pracices for machining magnesium has reduced the problems.

Present military specifications require that photographic equipment operate in temperatures ranging from +20° to 120°F and that this equipment operate after being stored at any temperature between −65°F and +160°F.

In order to retain a sharp, high reso-

Fig. 2. Main envelope casting of a viewfinder cast in one piece with ⅛-inch wall thickness. Overall size is 20 by 20 by 12 inches deep.



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CHICAGO, ILL. • CLEVELAND, OHIO • HARTFORD, CONN. • HOUSTON, TEXAS • PHILA., PA.
CANADA. Walker Metal Products, Ltd., Windsor, Ontario.

■ *Fig. 3. Large 26 by 30-inch magnesium base casting for mounting optical assemblies of guided missile programming equipment.*

lution image despite the differences in thermal expansion between optical elements and their magnesium housings, clearances are provided between the lenses and their mounting seats. Depending upon the type of optical glass used, a lens having a diameter of 3¼ inches will require a clearance of at least .004 inch. Optical misalignment due to this clearance is avoided by contouring the lens and its seat so that the lens mounting is self-centering.

Problems in mounting front surface mirrors in precision optical instruments are similar to those encountered with lenses and prisms. To provide accuracy in locating the reflecting plane of a mirror, a continuous raised pad around the periphery of the casting is machined with close tolerance to the mirror clip mounting surfaces. Equally spaced conical springs hold the mirror in position against these clips.

The material must be non-magnetic, able to withstand pressurization. Magnesium fulfills both requirements. The eye lens assembly of a viewfinder is located in the upper center of the aircraft control panel, while controls and other elements of the photographic system are located in the center of the panel. Since all of these parts are close to the magnetic compass and other electrical instruments, only a non-magnetic material such as magnesium is suitable.

Since the cockpit of most reconnaissance planes is pressurized, the portions of the viewfinder which extend into the cockpit must serve as a pressure seal. This is done by means of a rubberized seal between the eye lens housings and the pressure bulkhead, and by sealing the housing casting and eye lens mounting to withstand compartment pressure.

Air at ambient pressure is circulated through the interior of the viewfinder to prevent moisture from accumulating on the lens surfaces. To retain pressure within this closed air circuit requires sealing between mating surfaces and pressure-tight finishing of the castings themselves. Tests have proven that the military requirements for pressurization can be met by applying a primer and two coats of baked enamel on the exterior and interior of all external magnesium cast parts.

A significant factor in effecting this pressure seal was the excellent surface finish obtainable on the raw castings produced in a fine sand mold. No additional grinding is required before finishing and the tough close molecular skin, typical of the as-cast state, is not marred by possible leakage points. At the operating pressure difference of 8 psi, no leakage problem has been encountered, even at ⅛-inch thickness.

Although a thinner wall casting would have maintained the necessary pressure differential, a heavier wall is used for stability in machining and to provide optical rigidity. In one installation, a near interference between internal mechanism and the airframe required that the envelope casting wall be reduced to 1/32-inch. This problem was solved by cutting a hole in the envelope at this point and covering with a .032-inch flush magnesium cover plate. This plate was secured with drive screws, pressure-sealed by adhesive.

Solves Other Problems

Magnesium has also solved many problems where rotational inertia is a significant factor. A three-position lens turret, for example, must rotate from position to position in half a second. To start and stop this rotatable turret without inducing excessive shocks meant that the total mass must be kept to a minimum. Therefore, the turret body and the six lens holding brackets were all cast from magnesium.

Ground based photographic equipment such as copy cameras, contact and projection printers, viewers, gun sights, recording cameras and missile guidance system equipment must also be light in weight for mobility. The example shown in Figure 3 is a magnesium baseplate casting used in guided missile programming equipment. The close tolerances required for optical and mechanical alignment require that the bosses shown in the figure be machined to the same height within ±.0005-inch.

To maintain rigidity over the surface of this 5/16-inch thick baseplate, ribs having a depth of 2½ inches were cast into the reverse side. All four corners have small ribs which act as recessed hand grips. To prevent distortion of the baseplate when resting on an uneven surface, rubber mounting pads are installed on three equally spaced bosses.

The focal platen of a projection printer shown in Figure 4 is a 48-inch square plate having a thickness of only 1-inch. Initial machining was done on the ribbed side of the plate to produce a flat reference surface. The opposite unribbed side must have a flatness variation not greater than .003-inch in order to hold the photographic film absolutely flat.

In grinding this surface, the platen was secured to a Blanchard grinding machine table by end blocks and by the pressure exerted by the grinding wheel. To prevent distortion of the platen due to heat generated during the grinding operation, large quantities of cooling water were circulated past the grinding area. To aid the circulation of cooling water around the grinding wheel, 50% of the wheel segments were removed.

Our success in the use of magnesium castings has encouraged us to look for even wider applications. Other examples of magnesium in military photographic equipment include copy cameras, strip cameras, aerial cameras, guided missile programming equipment, oblique sights, viewfinders, scanners, light monitors, camera control units, stabilized camera mounts, film viewers, stereo viewers, printers, projectors, magazines, cassettes, dehydrators, artificial photo lighting structure, periscopes, camera sights, oscilloscope cameras, data recorders and helicopter blade trackers.

Any firm that does this type of precision work should consult with a pattern shop and foundry on magnesium castings in the early design stages. It is advisable to call in these sources when the castings are being developed in the layout stage on the drafting board. Many headaches can be eliminated, casting and machining cost lowered, rejections reduced and a finer finished product obtained.

Considerable credit for a majority of our castings must be given to Curto Ligonier Foundry Co., Melrose Park Ill., for the excellent thin wall castings and their cooperation on helping our engineering department on magnesium casting problems.

■ *Fig. 4. Square focal platen of a projection printer measures 48 inches square. Reverse side is machined to a flatness variation not greater than 0.003-inch.*

Be Specific . . .

. . . that's how to get maximum profit out of your industrial advertising dollar in today's competitive metalworking market.

And here's a market—the light metals industry—that's not only specific, but also growing fast. The industry is summarized below, showing the 25,339 plants by industry category and by region. Every one of these plants processes and/or uses aluminum, magnesium, or titanium in the manufacture of end products.

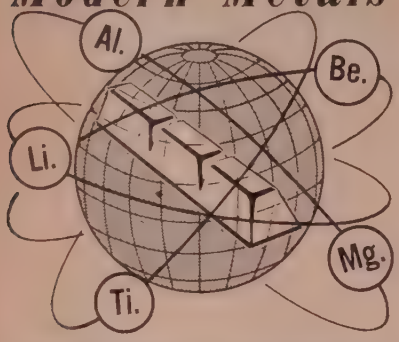
CENTRAL STATES
BUILDING INDUSTRY 1759 768 281 2808
CONSUMER DUR GOODS 728 175 73 976
CONTAINERS & PKG 198 50 12 260
ELECTRICAL INDUSTRY 678 114 43 835
MACH. & EQUIP. Non-Elec. 1065 271 58 1394
SCIENTIFIC & TECH INST 323 54 13 390
TRANS. & PARTS 708 142 53 903
ORDNANCE & MILITARY 22 5 9 36
LIGHT METALS PROC 2663 461 184 3308
MISCELLANEOUS INDUS 363 80 31 474
Area Totals 8507 2120 757 11,384
WESTERN STATES
BUILDING INDUSTRY 163 621 481 1265
CONSUMER DUR GOODS 18 148 61 227
CONTAINERS & PKG 5 63 30 98
ELECTRICAL INDUSTRY 14 183 46 243
MACH. & EQUIP. Non-Elec 21 211 107 339
SCIENTIFIC & TECH INST 14 74 32 120
TRANS. & PARTS 40 310 101 451
ORDNANCE & MILITARY 5 30 5 40
LIGHT METALS PROC 91 642 289 1022
MISCELLANEOUS INDUS 9 43 29 81
Area Totals 382 2325 1181 3888
EASTERN STATES
BUILDING INDUSTRY 436 1681 760 2877
CONSUMER DUR GOODS 155 459 164 778
CONTAINERS & PKG 48 148 44 240
ELECTRICAL INDUSTRY 247 589 105 941
MACH. & EQUIP. (Non-Elec 204 599 98 901
SCIENTIFIC & TECH INST 113 280 51 444
TRANS. & PARTS 123 300 143 566
ORDNANCE & MILITARY 15 22 17 54
LIGHT METALS PROC 656 1604 424 2684
MISCELLANEOUS INDUS. 127 403 52 582
Area Totals: 2124 6085 1858 10,067
25,339 PLANTS
A market survey . . .

. . . by Modern Metals defined and charted this industry, and Modern Metals' circulation list is based on this survey. Here, then, is the most accurate and comprehensive light metals industry list in existence. Only Modern Metals has this dynamic list, made up entirely of manufacturing plants, and only Modern Metals is read in every one of these plants. That's why Modern Metals is by far the most efficient advertising medium for companies that supply materials, equipment and services to light metals processors and users.

MODERN METALS

1813 Tribune Tower Chicago 11, Ill.

Modern Metals



The only magazine that reaches all 7,000 plants that produce, fabricate and cast aluminum, magnesium, titanium, beryllium and lithium . . . plus some 18,000 plants that use these metals in manufacturing end products.

MODERN METALS provides profitable, low-cost penetration ($280.00 per page) of the light metals industry—some 25,000 metalworking and manufacturing plants that regularly buy:

MATERIALS

Anodizing materials & equipment
Billet, ingot & flux
Castings, forgings
Extrusions, tube
Coatings, cleaners, etchants, finishes
Lubricants, refractories
Plate, sheet, coil, rod,
Bar, wire & foil
Structurals, shapes
Welding wire, solder

EQUIPMENT AND SERVICES

Anodizing & enameling
Fabricating & casting
Fasteners & screws
Rolling mills & presses
Cut-off machines
Extrusion & forging presses
Die casting machines
Welding equipment
Extrusion & die casting dies
Processing machinery
Heat treating furnaces
Melting & holding furnaces
Finishing equipment
Saws, blades
Roll forming machines
Slitters & slitting
Straighteners, stretchers
Stamping & drawing
X-Ray equipment

Write to M. Page for market survey:

THE LIGHT METALS CONSUMING INDUSTRIES

. . . a numerical listing of 25,339 plants in 10 basic industries and 71 within-industry groups . . . by state and region.

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Read in companies that produce, fabricate and cast aluminum, magnesium and titanium, and firms that use these metals in manufacturing end products.

Merger to create

LARGEST INDUCTION EQUIPMENT MAKER

FORMATION of the largest integrated manufacturer of induction melting and heating equipment will take place within a few weeks when terms of a recently announced merger are approved by stockholders of the firms involved.

The pending merger was announced February 19 by John A. Logan, president of Magnethermic Corp., Youngstown, Ohio. Magnethermic will acquire the assets of Ajax Electrothermic Corp. and Ajax Engineering Corp., both of Trenton, N. J. No stock will change hands: the venture will be financed through long term loans. The purchase price was not divulged.

Name of the new firm will be Ajax Magnethermic Corp., with the Ajax firms operating as the Ajax Electrothermic and Ajax Engineering Divisions, and the Youngstown plant functioning as the Magnethermic Division. Dr. Guilliam H. Clamer, president of Electrothermic and Chairman of Ajax Engineering, will join John Logan, B. E. McArthur and C. A. Covington on the board of the corporation. Headquarters will be in Youngstown.

"The combining of these three companies will create the first fully integrated manufacturer of a complete line of induction heating and melting equipment in both low and high frequency types," Logan explained.

"Both Ajax companies have operated primarily as makers of induction melting equipment. Ajax Electrothermic has concentrated on high frequency furnaces, while the Engineering Corporation has specialized in low frequency equipment."

Founded Industry

Electrothermic was organized by Dr. Clamer and Dr. Edwin Fitch Northrup in 1920 to develop high frequency heating apparatus. Little was known about the process at the time, and Dr. Northrup's developments formed the foundation of what is today a major segment of the industrial heating industry.

Although the company developed many applications of its high frequency furnaces, it did not have the financial resources to exploit many of them, and found it necessary to license others to build many of its developments. Such prominent concerns as Westinghouse, American Brass, and Ohio Crankshaft Co. are among those who entered the induction heating field through licenses granted by Electrothermic.

"Today, Electrothermic is the world's largest manufacturer of high frequency induction melting furnaces," Logan added. "Its plant in a suburb of Trenton employs about 90 people."

Ajax Engineering was organized in 1942 to develop and market a 60-cycle low frequency induction melting furnace. Known as the Ajax-Tama-Wyatt (for its inventors, Manual Tama and James Wyatt), this furnace is widely used in the aluminum die casting industry as well as for melting aluminum for billet casting and in other nonferrous melting work.

"Ajax has grown rapidly since its formation, and is presently the country's largest maker of 60-cycle induction melting furnaces," the announcement stated.

Heaters for Extruders

Magnethermic Corp. was formed in 1948 to develop a line of 60-cycle induction billet heaters for extrusion and forging plants. The first two Magnethermic billet heaters employed single-phase coils, were rated at 60 kw., and handled about 400 pounds of aluminum billets per hour for 500-ton extrusion presses. The company subsequently developed a 3-phase coil, and has built heaters for all types of extrusion operations, including the Air Force Heavy Press Program.

"With the rapid postwar expansion of the extrusion industry, Magnethermic heaters have become a byword in the industry," Logan pointed out. "Over 80% of all the aluminum extrusion operations installed since the war have utilized Magnethermic heaters."

The company has obtained patents on many of the unique features of its heaters, and has licensed firms throughout the world to manufacture the units. A subsidiary, Magnethermic, G.M.B.H. Germany, was formed within the past year to manufacture the products for the European common market.

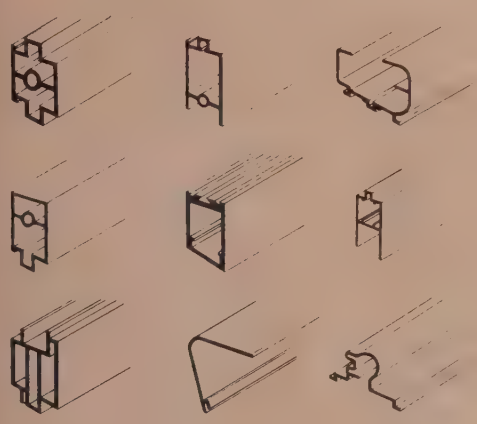
Magnethermic entered the high frequency heating field in 1954, developing a complete line of heating stations, control units and radio frequency oscillators. Today, the company is considered a leader in the industrial heating and heat treating field.

When merger of the three companies is completed — by May 1, it is expected — the new company's plants in Trenton and Youngstown will employ more than 300 people and will have a total manufacturing area of approximately 170,000 square feet.

Extruded aluminum shapes

for industry

WELLS ALUMINUM CORPORATION



Responsibility, reliable workmanship and dependable service, we feel, best describe our manufacturing and sales policies. Above all else, they are the things we strive for in our day-to-day operation. With a complete engineering staff, we assume the responsibility of providing our customers with any engineering assistance they may need . . . whether it be for an existing extrusion requirement, or for new, economical ways to employ aluminum extrusions in your manufacturing process. We welcome the opportunity to discuss your extrusion requirements with you.

Mail this coupon today for more information on Wells' extrusion facilities and engineering assistance.

Wells Aluminum Corporation, Dept. MM-1,
North Liberty, Indiana

Please provide complete information about the Wells extrusion operation.

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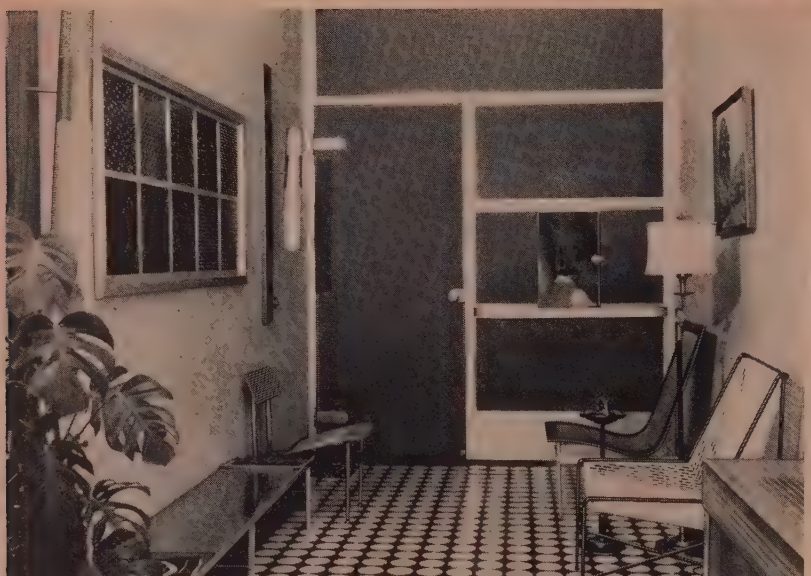
News Products and People



Reception Room Sells Perforated Aluminum

A showcase displaying the beauty, utility and versatility of various perforated materials is the newly remodeled lobby of headquarters building of the Harrington & King Perforating Co. at 5655 Fillmore St., Chicago 44, Ill.

Table frame, chair and radiator cover of aluminum illustrate use of aluminum in interior decorating. Seat and back of chair (at left in photo) are 18 gauge aluminum. The other chair has body of perforated enameled steel, and wrought iron frame.

Radiator cover (foreground) of 1/8 in. aluminum permits free heat circulation, while concealing the radiator itself.

The framing around the glass partitions and door is of aluminum, as is the frame around the display panel on the wall. Display panel on the wall is back-lighted, and displays the newest Harrington & King perforated patterns.

Aluminum Production, Shipments Foreshadow Recovery

Domestic production of primary aluminum, in the doldrums through mid-1958, commenced to pick up as the year approached its end. By November, production had crept back to 140,962 tons, 1000 tons above the January, 1958 figure. December's score was 152,301 tons, which was followed by 156,708 tons in January of this year. This turned out to be an all-time monthly record for the domestic industry, the Aluminum Association reported.

"The rise in monthly output was due to increased production at new facilities recently brought into operation and the reactivation of some potlines temporarily closed earlier in the year due to an apparent excess of aluminum," a Bureau of Mines report said.

There was some indication of improved business picture in the shipment of 236,000,000 pounds of aluminum mill products in December. This represented a 9% rise over November 1958 shipments of 216,000,000 pounds. At the same time, December's shipments of 96 million pounds of pig and ingot were 12% above November shipments of 86,000,000 pounds.

However, net shipments of ingot include shipments by importers and represent shipments to consuming industries, i.e., for uses other than processing into mill products. Such uses include shipments of ingot to foundries, shipments to steel plants and others for destructive uses, and export.

Magnesium Production, Use Near Balance

As was to be expected, U. S. commercial production of magnesium dropped appreciably last year — to 30,400 tons, a 63% decrease from 1957's 81,263 tons. The decrease resulted from acquisition by The Dow Chemical Co. of the big government-owned magnesium plant at Velasco, Texas early in '58 and suspension of operations there.

After Dow closed the plant on March 1, only two primary magnesium plants were left in operation: Dow's electrolytic plant at Freeport, Texas, and the Government-owned silicothermic plant at Canaan, Conn. In November '58, Alabama Metallurgical Corp. began construction of a plant at Selma, Ala., to produce magnesium from dolomite. Expected annual production capacity for this plant is 7,000 tons.

Recovery of secondary magnesium was estimated at 8,500 tons for '58, as compared with 10,658 tons in 1957.

Consumption of primary magnesium was 35,000 tons, or 21% below 1957. The drop was the result of a decrease of over 50% in use of the metal as a reducing agent to produce titanium.

However increases were reported for use of magnesium in structural applications such as aircraft and missiles, electronic equipment, transportation and in metals fabrications plants for jigs, tools, dies and fixtures. New magnesium alloys with improved physical properties were reported during the year as well as new and improved protective coatings.

The base price of primary magnesium ingot in standard 42-pound pig form remained at 35.25 cents per pound after increasing from 33.75c per pound in August, 1956.

Total imports of magnesium in all forms during the first nine months of the year were 305 tons, which was 59 tons below imports in the same period during 1957. Exports for the same period of '58 were 870 tons, in contrast to 494 tons in that period of 1957.

Preliminary reports for the various producing countries show a decrease in worldwide production of 35% below the previous year. Total world production for '58 was estimated at 101,000 tons, exclusive of unknown tonnage produced in Red China; 156,000 tons was produced in 1957.

Titanium Industry Strong, If Reduced, Report Shows

Production in most segments of the domestic titanium industry declined considerably in 1958. The U. S. Bureau of Mines reported that production of ilmenite was 600,000 short tons, down 21%. Rutile production decreased 3% to 7,000 short tons and shipments of rutile dropped to 1,700 short tons, the lowest since 1934.

But production and consumption of titanium metal showed an increasing trend by the end of '58. Production of titanium sponge metal for the year was about 4,585 short tons, or 27% of the peak output in 1957. Ingot produc-

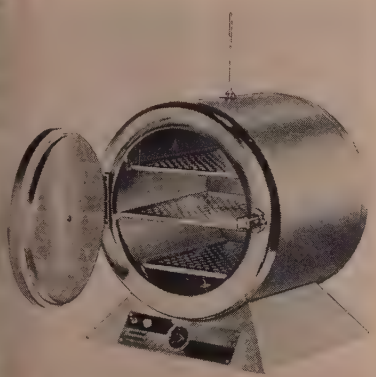
'58 was 5,408 short tons compared 10,009 short tons in '57.

Consumption of sponge metal fell to 47 short tons or roughly one half that 1957 (8,221 short tons). Consumption ingot fell from 10,428 short tons in to 4,909 short tons.

About 2,600 short tons of titanium nge metal was delivered to the Gen- l Services Administration under the ms of Government contracts, bringing total sponge held by GSA at the d of 1958 to 22,400 short tons. Under esent contracts there will be no fur- er deliveries of titanium to the Gov- nment.

The Quebec Iron and Titanium Corp., ned by Kennecott Copper Corp. and ie New Jersey Zinc Co., shut down oduction in September but expects to pen about April 1959. QIT is the ly commercial producer of titanium g in North America.

Price per pound for titanium sponge tal during the year was further re- ced to $1.70 for the last quarter. Mill oducts, including sheet, strip, plate, re, forging billets, and hot-rolled bars declined in price during the year.



eats Fast, istributes Heat Evenly

A new circular laboratory oven em- oys double-wall construction with its ıter shell steel, finished in a neutral ımmertone green with prime coating prevent corrosion, and its inner shell uminum. Four heaters, fastened to e outside of the aluminum inner shell, nduct heat to the aluminum inner rface providing fast heat-up as well as ıproved uniformity of heat distribu- on.

"Round design increases the natural rculation of air, assures uniform heat roughout the working chamber with o cold corners and no hot spots," says .A. Cook of Hevi-Duty Electric Co., ilwaukee 1, Wis., manufacturer of e "Circ-O-Therm" oven.

The oven operates on either 115 or 30 volts AC; heats to temperatures up 250°C. (482°F.). Work chamber of the ven is 13 in. deep, 15 in. diameter. Overall dimensions are 20 in. wide, 18 in. deep, and 23 in. high. Three removable shelves, perforated for circulation of air, are aluminum.

A power selector switch panel permits high or low input to the heating elements. The temperature can be raised from room temperature to 200°C. in less than one hour with only a 600 watt input.

A list of applications of the "Circ-O-Therm" includes heating for "joggling" (aluminum forming), age hardening aluminum and magnesium alloys, heating metal for metal to plastic bond, metal corrosion test in hot liquids, and paint baking.

Kaiser Adds Two Potlines, Plans Can-Metal Rolling

Kaiser Aluminum & Chemical Corp. will add two new aluminum potlines to the company's Ravenswood, W. Va., plant and will add facilities for rolling aluminum for cans at the Trentwood, Wash., plant. Overall production capacity will thus be raised from the present 537,000 tons a year to 609,500 tons despite the shutdown of one aluminum potline at the Mead, Wash. plant in January.

Kaiser had reopened the seventh of eight potlines at Mead last October, but earlier in January the company an-

A giant step forward in the manufacture of Carbide Tipped Saw Blades

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• GOLD-DOT •
CARBIDE-TIPPED SAW BLADES
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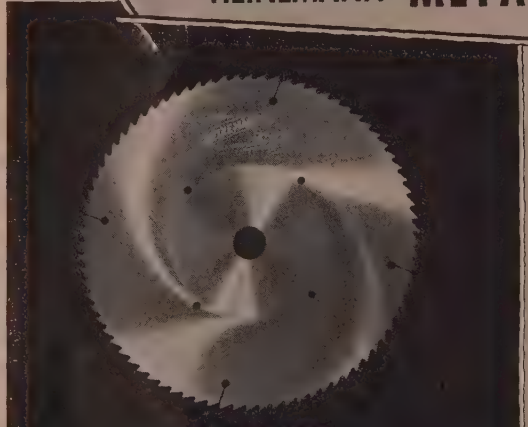
These discs give you a saw that is noiseless, vibrationless, smoother cutting, highly resistant to crackage.

Custom made from the highest quality steel and carbide available. Perfectly balanced, sharpened and tensioned.

Available in sizes from 4" to 36" diameter, any tooth spacing and thickness.

WITH LOCKED IN TIPS AND VIBRATION DAMPENERS

HEINEMANN METAL SAWS



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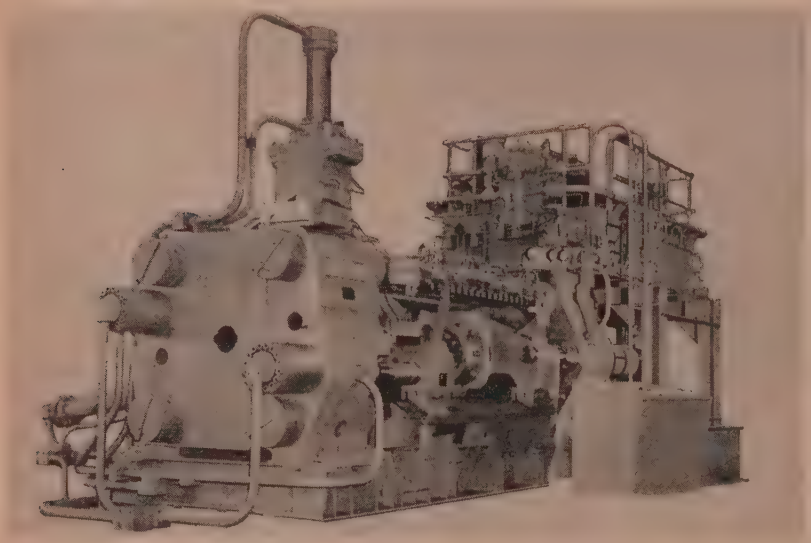
nounced a cut-back in production at the Trentwood, Wash., fabricating plant which draws much of its primary aluminum from the Mead reduction plant.

The scheduled potline additions are part of a $400 million expansion program begun in 1954 and due for completion later this year, according to R. A. Clayton, vice president and treasurer. Kaiser Aluminum's commercial sales volume for '58 showed a 9% increase over the previous year, Clayton noted, but the company reported slightly smaller earnings in 1958.

The $3-million expansion program at the Trentwood rolling mill will include installation of rolling mill facilities for can manufacturing, special finishing, and drying and coiling equipment in the existing plant buildings. Kaiser has been developing the aluminum container to replace tin cans.



New Press Extrudes Aluminum At High Speeds

A new 1500/1800 ton extrusion press for high-speed production of aluminum shapes has been unveiled by Sutton Engineering Co., First National Bank Building, Pittsburgh 22, Pa. First of the units was manufactured for Detroit Gasket and Manufacturing Co.

The press is now being used for the high-speed extrusion of aluminum shapes for the automotive industry. Detroit Gasket reported substantial improvement in production. The press frame was shipped in one piece on a special flat car to Detroit Gasket's Belding, Mich., plant to facilitate installation and start-up.

New Sutton design features include a two-piece main cylinder and housing arrangement, precision controls, and double-die slide design to facilitate rapid die change.

Power is furnished by two oilgear type DY pumps driven by a 350 HP double-ended motor. Either or both pumps may be used. Easy mechanical and hydraulic maintenance is possible, Sutton said, and all basic components have been made accessible.

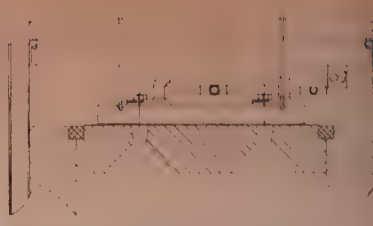
U.S. To Auction Wartime Magnesium Plants

Six government-owned magnesium production plants are about to go on the auction block if no government agency exercises a prior claim, and the likelihood is slim that there will be any great eagerness to buy them.

The plants, in various stages of obsolescence, represent a government capital investment of about $54 million and had a total rated capacity of some 67,000 tons of primary magnesium during World War II. Probably the big factor in the decision to dispose of the facilities (and the main discouragement to any prospective purchaser) is the greatly expanded capacity of The Dow Chemical Co., the lone commercial producer with an effective capacity of 85,000 tons annually.

The fact that Alabama Metallurgical Co., jointly owned enterprise of Brooks & Perkins and Calumet & Hecla, will soon be in production with an initial potential of 6000 tons annually probably played its part in the decision to sell.

The plants involved are: Manteca, Calif., 10,000 tons capacity; Wingdale, N. Y. (Amco Mfg. Co.), 5000 tons; Lucky, Ohio, 5000 tons; Spokane, Wash. (Electromet), 12,000 tons; Painesville, Ohio (Diamond Alkali Co.), 18,000 tons; and Canaan, Conn. (New England Lime Co.), 5000 tons.



Radiant Furnace Roof Panels Cut Fuel Costs

A pre-piped radiant roof panel f
rebuilding and conversion of industri
processing furnaces, including forgi
and aluminum melting furnaces,
made by the J. A. Kozma Co., 24
Wyoming Ave., Dearborn, Mich.

It consists of radiant cup type bur
ers mounted in a one-piece refracto
tile casting. Connection of a single g
supply line and a single air line c
be accomplished quickly and easily. T
entire roof panel can be suspended
integral 5/8-in. steel tie rods attach
to the reinforced refractory cover pla
Final sealing is simplified by a 1½-i
step on all four sides of the panel.

Companion arches are made for u
with the radiant panels as front wa
in slot-type furnaces or as curtain wa
in continuous furnaces.

The panels offer increased heati
efficiency for forming and forging
steel and for die casting, sand casti
and permanent molding of aluminu
according to Kozma. High speed co
bustion, with short flame length a
low forward velocity of combusti
gases, permits installation of the pa
closer to the work.

Intense heat radiation combined w
faster, more uniform heat absorpt
eliminates flame impingement and ke
scaling to a minimum.

The radiant panels also permit
great reduction in furnace wall sp
thus cutting down heat loss and p
viding increased fuel economy.

Mallory-Sharon Reorganiz Research, Development

A four-pronged research and deve
ment program is getting under wa
Mallory-Sharon Metals Corp., N
Ohio, according to Frank H. Van
burgh, president. The firm is a lea
producer of titanium and zirconi

A reorganized R&D team headed
Lee S. Busch, technical director, wi

1) Conduct fundamental researc
the metallurgy of titanium, zircon
hafnium and other special metals.

2) Develop new or improved ma
processing techniques required for
mercial use, including heat treatn
melting processes, determining the
tionship of mechanical propertie
processing methods, corrosion resis
and weldability studies.

3) Develop titanium, zirconium

WOLVERINE aluminum

for good sports

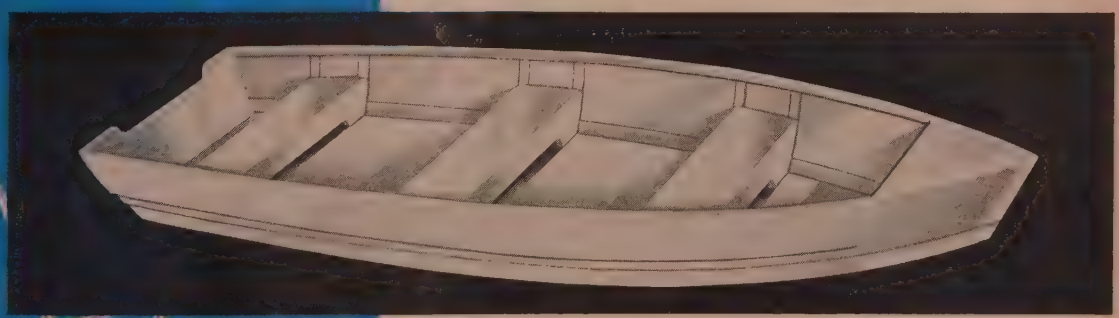
Is your company engaged in the sporting swim . . . manufacturing aluminum products that range all the way from ski poles to caddy carts to fish landing nets—to name but some of the possibilities?

Then you're interested in aluminum tubing . . . the kind that is manufactured the Tubemanship way by Wolverine Tube.

Wolverine aluminum tubing is rigidly quality controlled, has a satin-smooth finish and is available in a wide range of sizes in popular alloys! It's the kind of tubing that reflects Wolverine's years of metalworking experience, its constant research and skilled engineering.

If your requirements call for extruded aluminum shapes . . . Wolverine makes them, too . . . and under the same rigid, manufacturing policy.

Next time you order aluminum tubing . . . or shapes . . . specify Wolverine. There are none finer. Write, too, for a copy of the Wolverine Aluminum Catalog.



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CALUMET & HECLA, INC.
17262 Southfield Road
Allen Park, Michigan
Manufacturers of Quality Controlled Tubing

PLANTS IN DETROIT, MICHIGAN AND DECATUR, ALABAMA
SALES OFFICES IN PRINCIPAL CITIES
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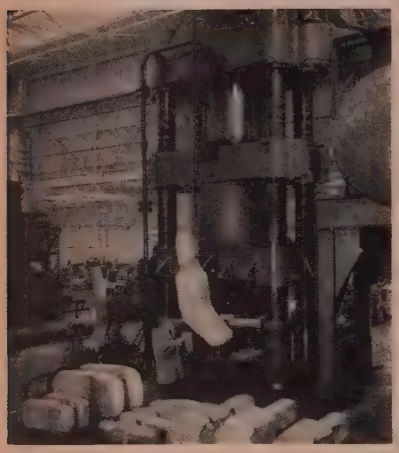
talum, columbium, beryllium, hafnium, tungsten and molybdenum and their alloys for anticipated corporate needs as established by the sales and marketing groups, and

4) Provide metallurgical service to all corporate groups, as well as to existing and potential Mallory-Sharon customers.

Noral Increases Aluminum Forging Capacity



Recent installation of a 4000-ton direct-acting hydraulic press at the Birmingham, England, works of Northern Aluminium Co. has greatly increased its capacity for the production of hand forgings, the company reports. It is also available for closed-die and no-draft forgings and for the pre-working of cast stock prior to rolling and extrusion in the company's works at Banbury and Rogerstone.

The Becker and Van Hullen press was first installed in the Dornier Works, Germany, and after the war confiscated by the Dutch government as war reparations. Before installation at Birmingham, two cylinders mounted at the top of the press were replaced by two push-back cylinders, reducing the height to 27 ft.

The press is fitted with an ejector gear which takes the form of a 24-in. diameter ram housed in a 17-ft.-deep foundation. From the bed plate rise the four main columns, 16 in. in diameter, surmounting which is the top cross-head. Below this is secured the main ram, 53 in. in diameter, of which the main cylinder, with the bolster secured to its lower face, moves up and down. The main cylinder thus has guides at its top and bottom and gives very accurate alignment between the upper and lower platens.

Working space between the columns is 7 ft. and the press has a stroke of 6 ft. It is operated by a system of finger-tip controls through electro-hydraulic valves with a range of speed from 0.08 to 0.50 inches per second.

Hand forgings up to 1500 lb. each have already been produced. Using the 45,000 lb. hammer already installed, the company will offer closed-die forgings up to 700 lb.

"The press has proved its usefulness in enabling stock to be pre-worked more economically and in bigger sizes than was previously possible," a company spokesman stated.

A mechanical manipulator with manipulating mechanism of Salem Brosius design handles large sizes during hand forging. Styled a "Manipulet" it has great flexibility of movement and a 1500-lb. capacity. The truck, of Yale and Towne design, has a 10,000-lb. capacity which includes the power required to operate the hydraulic system of the Manipulet.

Now . . . OLIVER
Hydraulic Cut-Off Saw cuts nonferrous tubing, extrusions, bars *FAST!*

Cuts thousands of pieces accurately without burr

This smooth running Oliver production machine will pay for itself quickly. It cuts tubes, extrusions, bars of aluminum, brass and other nonferrous metals. Cuts thousands of pieces without variation and without burr. A light touch on the large start button moves the saw in a straight line by hydraulic piston. The work is securely held by an air clamp. A 14-in. saw cuts 3" x 6"; an 18-in. saw cuts 5" x 6". Makes up to 28 strokes a minute. The table has a micrometer stop to gauge cuts from 1/16" to 20½" long. Write for Bulletin No. 94-DHM.

● *Oliver offers cost-cutting machines for nonferrous metals and hard-to-work materials: Circular Saws, Band Saws, Shapers, Millers, Belt and Disk Grinders and Polishers, Spinning Lathes. Write for this folder.*

OLIVER MACHINERY COMPANY
Established 1890 GRAND RAPIDS 2, MICHIGAN

Thickness Tester Measures Inside Pipe

A new non-destructive coating thickness tester measures, in a matter of two minutes, metal coatings on metal base, non-metallic coatings (such as paint and anodizing) on metal base, and metal films on non-metallic base. The Dermitron Model D-2 was developed by Unit Process Assemblies, Inc., 61 E. 4th St., New York City.

Dermitron D-2 comes with four measuring probes. A right angle probe (see photo) permits, for the first time, non-destructive measurements of most coatings and films on the inside diameters of pipes and bores in castings, down to ½ in. inside diameter. Special probes can handle even smaller sizes. An eight-inch circle area is required for measurement.

The Dermitron can be used for sorting and matching of metals and alloys, its manufacturer reports.

Titanium Anode Hooks, Baskets Improve Plating

Commercially pure titanium anode hooks and baskets, with high corrosion resistant qualities, have been developed by Mallory-Sharon Metals Corp., Niles, Ohio, to meet the need for corrosion resistance in nickel and chrome plating operations.

The hooks and baskets are made

standard sizes and shapes. Hooks range in size from 3½ in. to 8 in. with special sizes on request.

Because of fabrication from pure titanium, the hooks and baskets are said to have an indefinite life in highly corrosive mixtures. The hook can be submerged beneath the surface of the acid, allowing even dispersion of the nickel and sharply reducing nickel scrap loss and recovery costs.

New Alloy Pig Serves Billet Casting Needs

An economical new aluminum alloy pig product, designated 2301 alloy pig, has been announced by Kaiser Aluminum & Chemical Sales, Inc., Chicago 11.

The product is designed to serve as base metal for producing 6063 extrusion alloy and offers the advantage of having silicon pre-alloyed so that only magnesium need be added in the remelt furnace. It is thus especially suited for use by extruders who have billet casting facilities and for billet casters who supply extruders.

The alloy is produced from 99.5 grade pig and the silicon is held to closely controlled specifications.

Kaiser points out that field tests have demonstrated that extruders who use 2301 alloy pig to cast their own billet will obtain more uniform analysis in their billet. And this, in turn, will facilitate more economical production of quality extrusions.

Texas Alumina Plant Starts Up

Alcoa's newest and largest alumina refining plant, located at Point Comfort, Texas, began shakedown operations this month. Works Manager A. B. Kaltwasser said that when it is in full operation the plant will employ over 600 people. Ultimate cost of the operation will be over $45 million and the plant is designed for a possible future doubling of capacity.

The refining operation is equipped to process two distinct types of bauxite ore—one from Suriname, S.A.; the other from new Alcoa mining operations in the Dominican Republic.

The first shiploads of South American ore arrived at Alcoa's new Aransas Pass (Texas) transfer station around mid-January, to be shipped by barge 70 miles to the new refining plant at Point Comfort.

First deliveries of Dominican bauxite arrived at the transfer station in late January, and will be handled in the same manner.

Kaltwasser noted that the Aransas Pass transfer operation is a temporary expediency to be continued only until completion of the Matagorda Bay Ship Channel authorized by Congress this year.

Kaiser to Move General Sales Offices to Coast

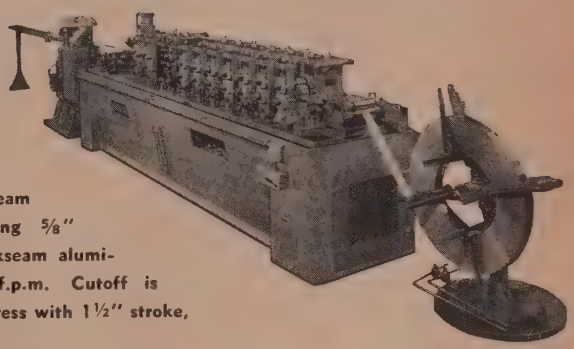
Kaiser Aluminum & Chemical Corp. has plans readied for the removal of its general sales offices from Chicago to Oakland, Calif., the firm's headquarters. The present Kaiser regional and district sales offices will remain in Chicago, as will an executive office and a staff of technical and field service personnel.

"Bringing together of all of Kaiser Aluminum's policy-making groups in managment, production, sales and market development in one headquarters will make possible more coordinated and effective action in the selling era that lies ahead in the aluminum industry," John Menz, the company's vice president for marketing, declared.

Menz indicated that the move would make for more effective marketing, speed up interdepartmental decisions, and strengthen the corporation's ability to participate in the development of more new applications of aluminum. He also pointed out that better service to aluminum users would result.

The move to Kaiser Center, the firm's home building now under construction in Oakland, will be accomplished in planned stages, with completion scheduled for about September 1st.

AMERICAN ROLLER DIE CORP.
ARDCOR HIGH PRODUCTION ROLL FORMING MACHINE FOR ALUMINUM SHAPES



This Model SF Lock Seam Tube Mill is forming ⅝" O.D., .016" wall lockseam aluminum tube at 120 f.p.m. Cutoff is ARDCOR Model 10 Press with 1½" stroke, 60 strokes per min.

The new small Model SF ARDCOR Machine features: High production speeds; spindles 1.5"; new style rugged base with tool compartment and slanted front recessed for better operator stance; special narrow side roll stands with close 10" horizontal centers; fixed spur gears; quiet running all V-belt drive; low voltage protection. Basic machine readily converted to a Cold Roll Forming Machine.

ARDCOR Roll Forming Machines and Lock Seam Tube Mills are available in seven standard sizes; other sizes to customer specifications.

If your products can be cold roll formed, ARDCOR engineers can supply advancements in design and machine construction to produce them better . . . at greater speeds and profit.

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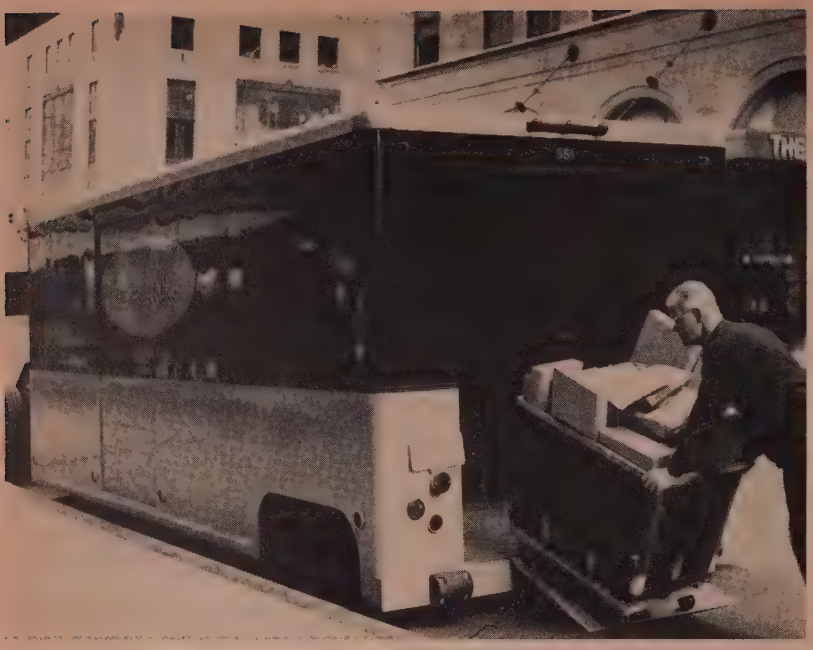
DESIGNERS, ENGINEERS AND BUILDERS: Single Roll Forming Machines or Completely Automated Production Lines for Cold Forming, Ferrous and Non-Ferrous Electric Weld and Lock Seam Tube Mills • Forming Rolls, Tubing and Pipe Rolls • Straightening, Pinch and Leveller Rolls • Cut-Off Machines • Slitters



Aluminum Semi-Trailer Cuts Loading Time 33%

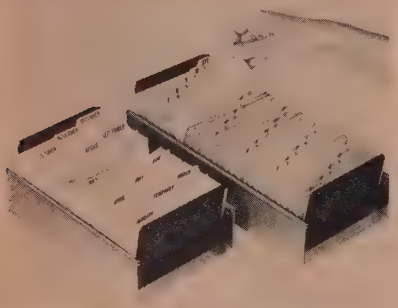
A new semi-trailer manufactured by Thompson Trailer Corp., 2 Old Court Rd., Pikesville, Md., tilts, tips and can be lowered to street level or raised to a high platform. Body of the Leveloder is fabricated from aluminum sheet to reduce weight to 9820 lbs.

Elevator action can move the cargo bed from street level up to 52 inches. Thompson eliminated the conventional rear axle by attaching the Leveloder's two rear wheels to hydraulic levers. When the trailer is at riding level, or 24 inches, the levers are diagonal. When the cargo bed is lowered, the hydraulic levers swing into a horizontal position, causing the rear wheels to retract into the trailer body like airplane landing gear.

The front of the trailer slides up and down in vertical channels. Controls and a 7½ HP gasoline motor are mounted on the support platform which rests on the kingpin of the tractor. Any conventional tractor can haul the Leveloder, according to Reynolds Metals, supplier of the sheet.

The trailer does away with heavy lifting, and reduces delivery costs by cutting loading time by one-third, according to Thompson. It comes in five- and ten-ton sizes and in lengths up to 34 ft. Thompson says it is ideal for moving all heavy cargos.

Anodized Extrusions Make Well Designed File Drawers



An aluminum file tray for 5-in. by 3-in. index cards, the most popular size, is being produced by La Jolla Industries, Inc., 4606-16 Santa Fe St., San Diego, 9, Calif.

The new tray is made of gold anodized aluminum extrusions, in lengths of 6 in., 9 in., 12 in., 18 in. and 24 in. with special lengths to order. Followers are jet-black high-impact styrene; they function by tilting in one direction to release, and in the opposite direction to engage.

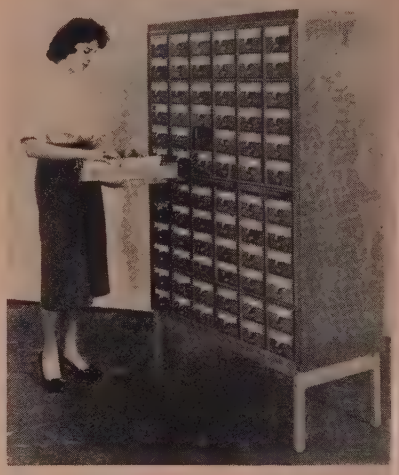
The Card Caddy will fit standard desk drawers either cross-wise or length-wise, a feature helpful in exchanging files at an office. The file may be used in drawer or removed.

Improved Etchant Formulation Introduced

A new, improved formulation for Etchalume 14 is reported by its manufacturer, Enthone, Inc., 442 Elm, New Haven, Conn., to be twice as effective in etching aluminum and to have much longer life than the original compound. Etchalume 14 is a strongly alkaline material which was originally designed to etch aluminum rapidly and uniformly without the formation of aluminum hydroxide scale or cake on the work, tanks or heating coils. Improvements have been made at no increase in price, Enthone, a subsidiary of American Smelting & Refining Co., reported.

The new formulation is a powdered material which is added to water. It can be used in a wide range of concentrations and temperatures according to the degree of etching desired. Complexing agents cause the aluminum dissolved in the bath to precipitate as a loose, flocculent powder rather than as a hard, tenacious scale as in the case with straight caustic soda solutions, according to Enthone.

Etchalume 14 is ideal for cleaning and etching of aluminum prior to plating, anodizing, bright dipping, welding, phosphating and chromate conversion coating. It is effective for selective reduction in size of sheet or wire by etching where the thickness must be reduced uniformly. Its rapid etching properties are also used for chemical deburring and for etching of nameplates.



New Furniture Will Pretty-Up Libraries

The "Designer" line of library furniture is a new addition to the seemingly limitless range of products of Remington Rand, Division of Sperry Rand Corp., New York. The result of collaboration between architects, librarians, Remington Rand and designer Norman Cherner, the group is made of anodized aluminum reinforced with steel, and birch wood.

Library furniture and technical equipment are included in the full new line — catalog cases, charging desks, tables and chairs. The first installation is now being made at the New Orleans Public Library.

Designer Cherner said he sought to develop furniture with "a warm feeling which combined metal and wood and will last as long as the library."

SCHLOEMANN

Aluminium Cable Sheathing Press

Double-acting horizontal 1,760 ton aluminum cable sheathing press. Upper: Sheathing power cable. Lower: Two-strand extrusion of wire rod.

Cable sheaths from 1/16 to 4 inches outside diameter and with any desired wall thickness over .008 inch can be extruded onto heat-sensitive cable cores of any length. The extrusion program may be extended by the production of wire rods, tubes and sections. Full automation of the operating cycle assures uniformly high quality of the products. SCHLOEMANN aluminum cable sheathing presses are operating in the U.S.A., Germany and other countries, main design features are protected by patents.

FELLER ENGINEERING COMPANY 1165 Empire Building, Pittsburgh 22, Pa.

HOT AND COLD ROLLING MILLS · COUNTERBLOW HAMMERS · HYDRAULIC PRESSES

Aluminum Siding Offers Beauty and Durability

The fresh look of Colonial clapboards is combined with the durability of aluminum by Wisco, Inc., 4014 Michigan Ave., Detroit, Mich., in the company's aluminum lap siding panels manufactured in white and four pastel colors.

The panels are designed for either home construction or remodeling. They can be quickly installed over wood, brick, cement block, stone, shingle and stucco surfaces.

The panels, 12-ft., 6-in. long with 8-in. weather exposure, are finished with two layers of enamel which is roller coated onto the aluminum strip, then slow baked to give a finish which will not peel, chip, crack or flake. The back of the material is coated with epoxy vinyl to protect the underneath side of the aluminum from acid-laden moisture.

Vent holes are located every 16 inches along the bottom edge of the panels to permit the escape of moist air. Nailing slots positioned every two inches at the top facilitate installation.

Wisco manufactures aluminum trim accessories as well as the panels.

Kaiser Studies Argentine Expansion

A 20,000-ton aluminum reduction plant may be built in Argentina at a cost of approximately $15 million. At a meeting with Argentine President Arturo Frondizi, Edgar F. Kaiser, president of Kaiser Industries Corp., disclosed that Kaiser Aluminum & Chemical Corp. now has a team in Argentina studying the feasibility of such a project.

The two leaders were discussing the possibilities of expanding industrial activities of the Kaiser affiliated companies in Argentina during President Frondizi's recent two week visit to the U. S.

Production of Industrias Kaiser Argentina, Argentina's only automotive manufacturer, may be stepped up to 50,000 vehicles annually by 1960. And tooling has been started to manufacture a new medium size passenger car, which is scheduled for production in the fall. Kaiser invited President Frondizi to attend the dedication in April of a new $2.5 million forge facility at I. K. A.

Lubricant-Release Agent Resists High Heat

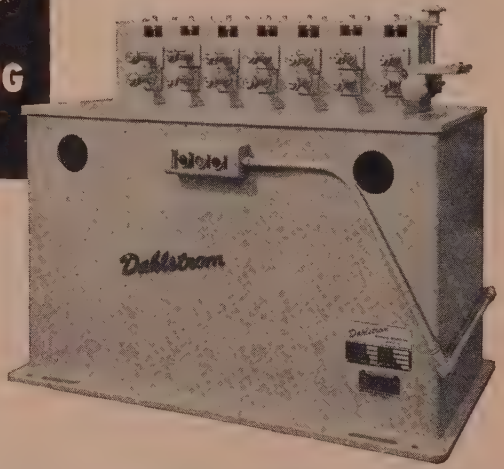
A lubricant and rust preventive that prevents metal-to-metal contact, eliminates or reduces stickers and toxic fumes, and insures complete lubrication where needed has recently been developed by Harry Miller Corp., 4th and Bristol Streets, Philadelphia 40, Pa., for use in die casting, forging, drawing, and stamping.

Hamicote will not clog spray systems or affect the metal or operating personnel. It is said to lower costs by providing more uniform, dependable results while increasing die life and eliminating down time for cleaning since it does not form scale, sludge, etc. around machines. Releasing action is improved considerably and the product remains on surfaces at up to 3000° F.

Hamicote insures sharp, accurate castings and forgings, according to the manufacturer, and it may be removed completely with plain water, alkali solutions or solvents. The material is a clear, amber, medium body liquid that disperses in plain water in any dilution to form uniform, white stable emulsions. Non-toxic, it is composed of extreme pressure lubricants plus metal in soluble form. It does not contain silicones, manganese, copper, graphite, or suspended matter.

ANOTHER
Dahlstrom
ROLL FORMING MACHINE

Rugged Construction for Long Life
MODEL 150-7 — Open Front Type



Designed for economical and long dependable operation to complement your present Roll-forming or production facilities. Low Cost — Long Service.

Spur gear design. All-welded construction. Spindles mounted on anti-friction bearings —hardened and ground. Roll diameter range 2½" to 3¼". Horizontal c-c distance 5". Available either front or outboard type. Write for bulletin.

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4231 W. Belmont Ave., Chicago 41, Ill., Phone: SPring 7-3670
Roll Forming Machines, Flying Cut-Off Presses, Coil Reels, Coil Lifts, Roll Straighteners, Press Feed Lines, Decoiling and Shearing Lines.

Aluminum Used in Large Microwave Reflectors

Passive repeaters are used by the microwave industry to reflect the microwave beams around obstructions which prohibit line-of-sight transmission.

Microflect Co., 2300 S. 25th St., Salem, Ore., has for the past three years manufactured the largest passive repeaters used by the microwave industry. The photograph shows front view of a 24-ft. by 30-ft. unit which is the largest made to date. Several this size are in service as are others ranging down to 8-ft. by 10-ft. passives. The passive repeaters are used on frequencies of 2KMC up to 7 KMC.

The reflecting surfaces are made up of 8-ft. by 10-ft. 6061-T6 panels which are bolted together in the corners with aluminum castings used for corner fittings. The units are flat across the face within —¼ in. +0 in. Extrusions used are 6061-T6 aluminum.

Birds Made of Colorful Enameled Aluminum

"Cut out" birds made of enameled aluminum decorate entrance to the cafeteria building of Columbus State School, Columbus, Ohio.

The birds were designed by Thelma Frazier Winter and made by Edward Winter using laboratory and furnace facilities of the Ferro Corp., 4150 E. 56th St., Cleveland 5, Ohio.

The enamel colored frit received its usual grinding and was applied on various areas of the birds. The pieces were then fired for ten minutes at 1000°F. Metal parts were pre-heated. Various sections of the birds were fastened together with brass bolts, and the ribbon of enameled aluminum at the base was attached to hold tubing sections together.

The project presents a new idea for builders and architects. Color is fused in a permanent vitreous enamel finish on aluminum sheeting or castings. Bodies of the birds are brown and turquoise with touches of lemon and orange color. Beaks are yellow, eye is black and white.

Reynolds Expands Packaging Lab Facilities

Reynolds Metals Co. has added three new facilities in Richmond, Va. to serve the $14 billion packaging industry. The installations include a modern building to house the company's styling and design services, a machinery development center, and a pilot research plant for developing flexible and semi-rigid packages.

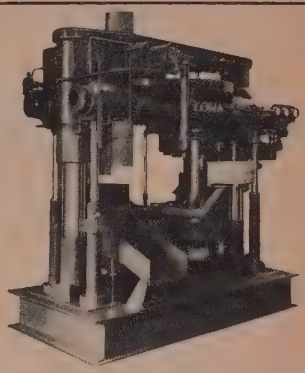
The styling and design building houses 38 specialists headed by general director James Birnie. Here the packaging, graphic, exhibit and industrial design sections, and the photographic laboratory and silk screen department are gathered under one roof for the first time.

Designers handle up to 600 projects a year, each requiring from one to a a half-dozen renderings. The silk screen shop turns out packages for customers who want to see how a proposed package design will look in a mass display.

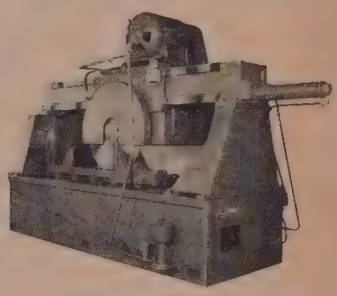
The research plant, probably the only facility of its kind in the packaging industry, has pilot equipment for developing new packaging materials and processes, including a 4-color gravure press (pictured) a plastic extruder for extrusion coating and laminating work,

LOMA

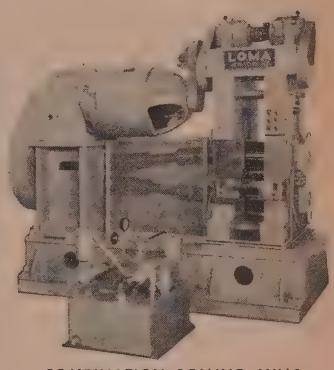
MAKES THEM ALL



CONTINUOUS CASTING MACHINES



CIRCULAR SAWING MACHINES



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- Saws and Cut-off Machinery
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MACHINE MFG. CO., INC.

114 East 32nd Street

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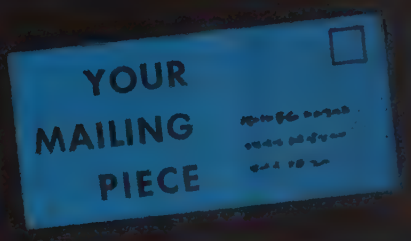


For doubly effective selling to the Light Metals Industry

REACH MORE THAN 25,000 LIGHT METAL PROCESSORS AND PRODUCT MANUFACTURERS

with this double barreled sales service

The light metals industry — over 25,000 firms that process and use aluminum, magnesium and titanium — is the growing-est and buying-est segment of the metalworking business. This year these firms are using more light metals in a richer array of new and improved products than ever before. They are also creating a huge demand for all the materials, equipment and services that metalworkers require.

Only Modern Metals covers this entire market. You can reap a two-fold benefit from this exclusive coverage by advertising in Modern Metals and taking advantage of Modern Metals' direct mail service. Mailings are made to the only detailed up-to-date mailing list devoted exclusively to the booming light metals market; can be aimed at the entire industry or only those firms in your marketing area.

TYPICAL RESULTS of direct mail campaigns by Modern Metals advertisers:

Case A — A manufacturer of aluminum soldering flux received over 3,500 inquiries from a mailing of 16,000 to Modern Metals' list. He commented: "Extremely satisfying, if not remarkable."

Case B — A recent mailing by a maker of colored aluminum coil brought a 9% return. Their comment: "A very effective mailing list . . . Replies are still coming in."

Case C — From a mailing of 10,000 letters, an aluminum foundry received 1,700 replies. Comment: "Total inquiries will exceed 20%, and some good business has already resulted."

Case D — An aluminum anodizing plant recently made a mailing of 6,500 pieces, and received 130 returns within two weeks. His comment: "We have already added seven new accounts, three of which are big volume customers."

●

For sheer market saturation you can't find a more potent sales tool than Modern Metals' advertising-direct mail service. We've got all the details ready for you. Simply write today to . . .

MODERN METALS

1814 Tribune Tower **Chicago 11, Ill.**

ne-color gravure press, coating ma- ie, Reyseal machine, and lamina- and spoolers.

The new machinery development ter is housed in a large building ich accommodates the product de- opment department, directed by inz V. Menking.

A staff of project directors and engi- rs under William E. Cheeley, direc- of packaging and consumer product velopment, work in cooperation with chinery manufacturers to develop w machines for aluminum packaging.

Reynolds now has the largest line of l container closing and handling chinery in the industry, the firm re- rts. The line includes a high-speed achine for closing up to 200 con- ners a minute, a "tuckwrap" machine r automatically crimping foil covers to frozen dinner trays, and machinery r producing, filling and sealing the mpany's "Clo'Can" package.

lew High Speed Gage Measures Cylinder Walls

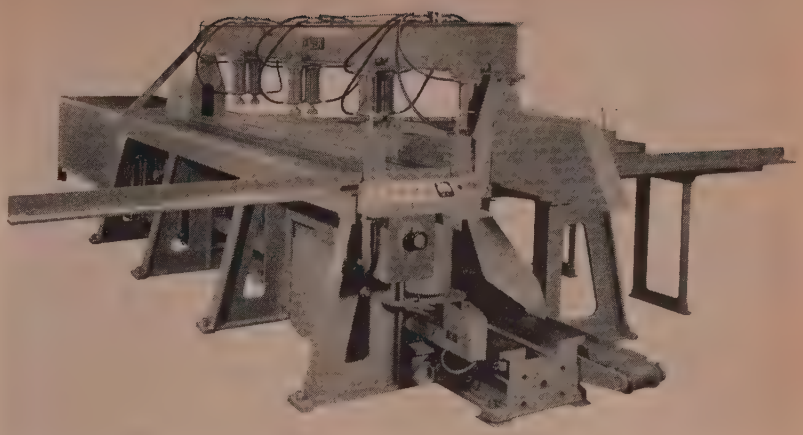
An ultrasonic gage utilizing the prin- ple of ultrasonic resonance simplifies easuring thousandths of an inch varia- ons in cylinder wall thickness. The on-destructive tester, designed by the rocess Development Staff of General Motors Corp., can be adapted to meas- re thickness of straight or curved sur- ces of aluminum and magnesium with nly one side of the material accessible.

In the principle of ultrasonic reso- ance a probing crystal is vibrated gainst the inside cylinder wall surface, weeping as high as 4,000,000 cycles per econd, until at some frequency point he surface is vibrating in harmony with the crystal. The resonance at this oint varies with the wall's thickness and thus gives an indication of the thickness.

The tester has a 14-inch oscilloscope tube on which an 11-in. scale is cali- brated for thickness variations as low as one-thousandth of an inch. Cylinder wall thickness is indicated by a single, vertical step in a bright horizontal line.

"The PDS tester requires no specially trained operator," said R. B. Colten, head of Process Development Staff's electronics department, "When it 'de- cides' cylinder wall thickness is too thin, a red low limit light flashes on. And it is possible to replace the warn- ing light with other devices for auto- matically marking or segrating sub- standard parts."

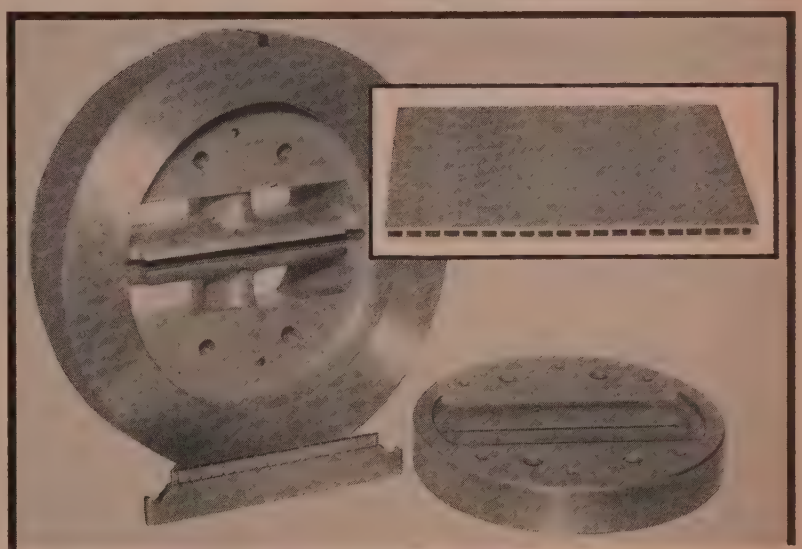
Ranges can be provided to give thick- ness measurements of materials ranging from .075 to 1.0 inch thick, depending on the kind of material being measured. Overall accuracy is within 2% of full scale reading.



Adaptable Saw Provides Economy, Accuracy

A heavy-duty production saw for precision cutting of aluminum and other nonferrous metals, identified as the Oliver No. 838 Plate Saw, has been developed by Oliver Machinery Co., 1025 Clancy, N.E., Grand Rapids, Mich. It was designed to meet a growing de- mand for a saw that would be adapt- able to individual requirements, yet provide economy of operation and satisfy rigid demands for accurate and fast work.

The plate saw has a heavy cast iron bed. Entire feed motor and saw motor unit travel on a 6-ft. carriage. The saw unit moves along the bed to cut through material placed on the heavy cast iron tables. Tables are 30 inches wide, and 4-ft. or 12-ft. long. The machine is furnished with table exten-



extrusion dies by mardis! shown above:

Original MARDIS-designed, liquid passage, 20-mandrel dies used to extrude the 10¼" extrusion (see inset) from a 9" billet! All MARDIS dies are expertly machined to exceptionally close tolerances. Let MARDIS solve **your** next extrusion problem.

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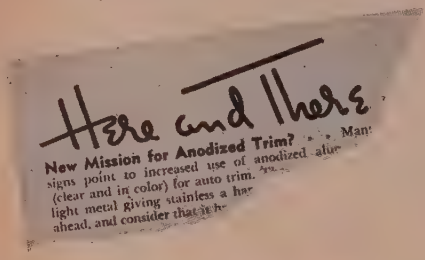
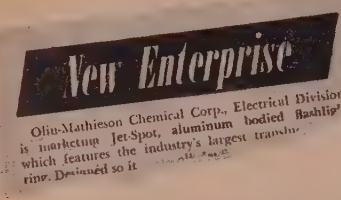

Here and There

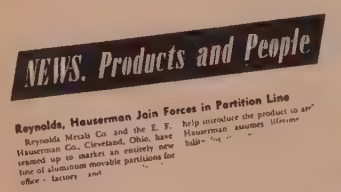
New Mission for Anodized Trim? ... Many signs point to increased use of anodized alu... (clear and in color) for auto trim. ... light metal giving stainless a ha... ahead, and consider that it h...

Useful Data

Over 100 buffing and polishing compounds are described in Bulletin Co-103 of the Hanson-Van Winkle Munning Co., Matawan, N. J., manufacturer of a complete line of finishing equipment and supplies. ... page, two-color bulletin has a full-page ... coloring, and ... doubl...

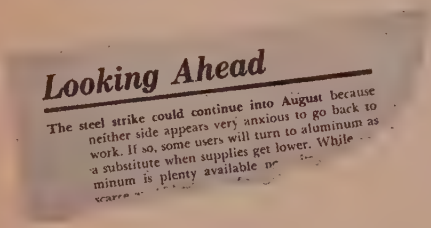

New Enterprise

Olin-Mathieson Chemical Corp., Electrical Division is marketing Jet-Spot, aluminum bodied flashlight which features the industry's largest transparent ring. Designed so it ...


NEWS, Products and People

Reynolds, Hauserman Join Forces in Partition Line

Reynolds Metals Co. and the E. F. Hauserman Co., Cleveland, Ohio, have teamed up to market an entirely new line of aluminum movable partitions for office ... factory ... and ... help introduce the product to ... Hauserman assumes ... basis ...


Looking Ahead

The steel strike could continue into August because neither side appears very anxious to go back to work. If so, some users will turn to aluminum as a substitute when supplies get lower. While aluminum is plenty available ...

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sions with seven large ball bearing rollers on each.

The machine is built in any length from 4 to 40 ft. capacity or longer in 4-ft. increments. Maximum length of cut made by a 12-ft. machine is 12 ft., 1½ inches. Maximum thickness of cut made with a 24-inch diameter saw blade is six inches.

The machine comes furnished with 5-ft. fence at the front and has a saw guard, splitter, and a 12-in. diameter carbide tipped saw blade. Other equipment includes a Norgren two-gallon spray lube system which directs the spray to the top of the saw blade.

Men-on-the-move

H. Y. Bassett, president of Calumet & Hecla, Inc., Chicago, has been named chairman of the board and chief executive officer of the Alabama Metallurgical Corp., Selma, Ala. Ground has been broken for a $3.5 million plant which will produce magnesium for metallurgical purposes and for structural materials for aircraft, missile and automotive industries.

United Engineering & Foundry Co., Pittsburgh, has appointed **William E. Thomas** as vice president of operations. The firm designs and builds ferrous and nonferrous rolling mills, mill rolls, auxiliary mill and processing equipment and other heavy machinery.

Jean J. Grunwald has been named research chemist of MacDermid Inc., Waterbury, Conn., manufacturer of metal cleaning, plating and finishing chemicals. Grunwald was formerly employed in the plastics engineering department of Northern Electric Co., Ltd., Montreal, Canada.

Lewis P. Favorite, manager of product sales of Aluminum Co. of America since 1955, has been made a vice president of the company to succeed Donovan Wilmot, who retired February 1 after 46 years' service with Alcoa.

In other moves, Alcoa appointed **W. J. Mitman** to the new post of administrative manager of product sales; he had been manager of sheet and plate sales, which post will now be filled by **R. A. Sweet,** Alcoa's Cleveland district sales manager. **H. T. Wilder,** product manager for distributors, warehouses and jobbers, has been named to the new position of commercial manager of product sales. **Albert H. Grosch,** formerly assistant district sales manager at St. Louis, succeeds Wilder. **James A. McGowan,** assistant New York district sales manager, succeeds Sweet in Cleveland.

Frederick B. Stevens, Inc., Detroit, has appointed **John Zimm** as sales representative in the Cleveland area. The

1 is a manufacturer of anodizing and ting equipment. Zimm has been in metal finishing industry since 1947.

R. A. Obringer and **J. D. Glenn II** re been appointed to newly created itions in the sales department of ucible Steel Co. of America. Obringer omes staff assistant to the assistant ieral sales manager — Product Divins. Glenn's new post is staff assistant Titanium and Vacuum Metals Sales vision. Headquarters for both will be ucible's home office in the Oliver dg., Pittsburgh 22.

Reynolds Metals Co. has elected **Wilm G. Reynolds** and **Joseph H. McInnell** executive vice presidents of the mpany. Reynolds had been vice presint in charge of the firm's research erations, which he will continue to rect. He is also president of Reynolds ternational, Inc. McConnell is general unsel of Reynolds Metals. Both men e directors and members of the firm's ecutive committee.

Financial Briefs

Kaiser Aluminum & Chemical Corp. t sales for 1958 were $408,559,000, a w high for the company, comparing ith net sales of $391,627,000 in '57. et income for 1958 was $25,232,000 or .43 per common share after preferred vidends, compared with $26,829,000 or .58 per share for '57. Fourth quarter rnings were $6,493,000 or 37 cents r share, compared with $4,298,000 or 2 cents per share for the same quarter '57. D. A. Rhoades, Kaiser's vice resident and general manager, stated at according to present indications, ne firm's overall shipments for 1959 hould exceed total 1958 volume.

Standard Packaging Corp., Boston, Mass., figured it had rolled up consoliated 1958 sales of about $70 million. his total would include the entire ear's volume of both the original comany and Eastern Corp., which was nerged with it in September, as well as econd half sales of Johnston Foil Mfg. o., St. Louis. In 1951, Standard's sales olume was only $8,503,000. For all of 957, the firm had sales of $37,385,000, while Eastern Corp.'s volume was $25,-13,000 and Johnston's was $6 million. or 1959, Standard is out for $80 million in sales.

Reynolds Metals Co. reported a consolidated net profit of $38,184,529 for calendar 1958, compared with $37,809,-712 in 1957. Earnings per common share were $3.25 last year and $3.21 in '57, both based on 11,188,215 shares of common stock outstanding and after dividend requirements on the company's 4¾% Series A, cumulative preferred stock. Net sales totaled $445,548,862 in '58, about 0.25% less than the firm's record sales of $446,578,766 in '57. The company's aluminum shipments for the year established a record exceeding 500,000 tons which was about 4% above the 1957 figure.

Fourth quarter '58 net income of the **Anaconda Co.** was about $14.5 million, equal to $1.35 a share on 10,714,627 capital shares outstanding. It was the highest quarterly net since the first period of 1957 when net totaled $18,-156,320, or $1.74 a share. Fourth quarter '57 net was $9,028,222, or 87 cents a share. The decline in earnings last year from 1957 was the result of lower prices received for nonferrous metals, reduced demand for fabricated products, a 50-day strike at its Chilean copper properties of its subsidiary, Chilean Exploration Co., and the general business recession. Basic elements of the firm's construction and expansion program were continued last year with expenditures for plant and equipment estimated at $74 million.

Two Miami, Florida aluminum companies, **American Aluminum Extruders Inc.**, 4851 N.W. 36th Ave., and **International Aluminum Corp.**, 3765 N.W. 74th St., have merged to form one of the largest independent producers of aluminum extrusions in the U. S. The new firm will be called **American International Aluminum Corp.** and will have annual sales of about $12 million, a spokesman said. Richard Walker is president of the new company. Other officers are Seymour G. Somerstein, executive vice president and general manager; Thomas Cooper, vice president, and Robert Somerstein, secretary-treasurer. American International will operate both plants and will purchase additional equipment for re-rolling, homogenizing and anodizing. Main products are aluminum billet, extrusions and warehouse items.

Preliminary figures of **Aluminium Ltd.** showed a net income of $22,400,000, or 74 cents a share for the calendar year 1958. This compared with $41,400,000, or $1.37 a share for '57. Consolidated sales of aluminum in all forms in the fourth quarter of '58 amounted to 142,-000 tons compared to 154,000 tons for the same period in 1957. Straight-line depreciation for the year 1958 amounted to $42.2 million and, in addition, an amount of $6.7 million was added to the reserve for future income taxes. The firm's reserve has also been credited with $10.8 million representing prior years' taxes recovered in 1958. Nathanael V. Davis, president of Limited, said that details of the company's business in 1958 would be given in the annual report to be released toward the end of this month.

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Looking Ahead

Buying of nearly all forms of aluminum continues to gain momentum despite an apparent slow-down in the economy's recovery from the recession. Orders show the "strongest upward trend in two years," Alcoa reported early this month. Kaiser Aluminum voiced similar sentiments around the same time, and added that incoming business should get even better in March. Both producers saw little to indicate that better business was due to any strike scares, as in the case of steel. Reynolds, however, was willing to attribute some of the "accelerated pickup" in orders to inventory accumulation on the part of major users.

Alcoa reactivated one of the two idle potlines at its Rockdale (Texas) works this month. An idle line at the company's Alcoa (Tenn.) works had been reopened about a month earlier. Both moves were ascribed to rising demand for aluminum, as reflected in the order books at Alcoa's fabricating plants.

Specific indicators of the upturn may be found in stepped-up activity among major markets for aluminum. In heavy construction — usually a good barometer — January contract awards topped the year-earlier level by 30%. Home building and mass housing — both of them big aluminum markets — continue their brisk clip, and spending for roads and highways has reached near-boom proportions. Other types of public construction — institutional building included — are almost keeping pace. Construction continues to be the principal prop of the economy in general and aluminum in particular.

But other markets show surprising strength, too. Appliance makers have been placing big orders for aluminum sheet and plate. They probably also account for some of the resurgence in tubing and soft alloy extrusions. Norge added 700 workers to its Muskegon Heights payroll this month. Reason: "Factory sales of refrigerators and freezers are three to four times those of this time in '58, and we're back-ordered for about a month, though our facilities are taxed to capacity." Orders for Norge washers, dryers and ranges are also up sharply. Other appliance firms — G.E. and Whirlpool among them — report rising volume. Though inventory buildup by dealers accounts for much of the pickup, consumer buying is also on the rise.

Recovery in air conditioning and heating field is typified by stepped-up ordering in January and February reported by Trane Co. Orders were 11% over year-earlier figures, and March apparently will show an even larger increase, said president D. C. Minard. Trane, a company that has favored aluminum for many years, expects its '59 sales and income to rise 7% over last year's rate.

Aluminum truck trailer production is another bright spot. Production and shipments of aluminum units last year were 6% above the 1957 total, even though shipments of all types (steel included) registered a 17% decline. December production of 2108 aluminum units was 75% higher than the year earlier rate and the highest level since June 1956. The truck-trailer industry should consume about 29,000 tons of aluminum this year — 23% higher than last year's consumption. Aluminum will continue its gains in this important field as over-the-road and piggyback operations expand, and demand for refrigerated trailers continues to spiral. Rising fleet operating costs and restrictions on gross road weight also favor aluminum.

Job shop die casters, groggy after a 30% tonnage decline in business last year compared with 1957 volume, are looking for a substantial upturn this year. The American Die Casting Institute bases its optimism on the improved look for autos and appliances plus a "marked increase in new die casting applications." The upturn in die casting demand began last September, making the final quarter by far the best for 1958. What's more, increased production carried over into 1959, with nearly all of ADCI's 124 members reporting higher output.

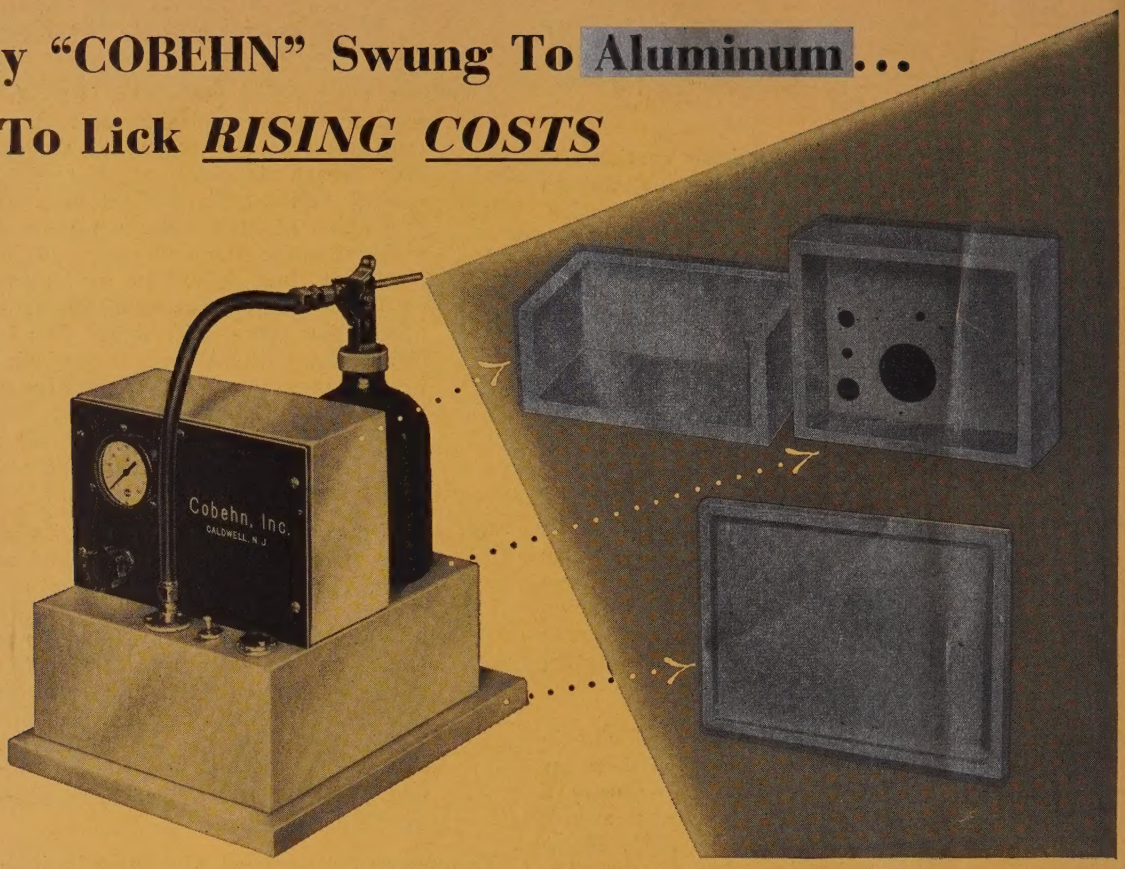
Throughout the southeast, aluminum business is picking up. One finishing plant, for example, is booked solid through April. An extruder is running around-the-clock, seven days a week, and is buying two new presses. A store front outfit sees 1959 sales as the highest in its 20 years; will move into a new 200,000-sq. ft. plant this summer and may add another extrusion press. Distributors in the southeast see a fairly substantial rise in demand for sheet — notably pre-colored stock. One southern rolling mill is booked to capacity. Main reason for all this: Heightened activity in the building field. Throughout these states there are many plans for large office and apartment buildings, most of which will use much bigger quantities of aluminum. Lots of motels are going up — a market that has been overlooked by most aluminum firms.

A notable drag on the prosperity trend for aluminum firms is still underway in Florida, though. Cut-throat competition there seems to be getting worse. Very few aluminum firms are making money; most are looking for credit. If you sell aluminum you're expected to give at least 60-day, even 90-day terms. Two noteworthy mergers have taken place. One is a merger of four firms — Hall Window, Miami Window, Robert Russell Metals, and Weather Products. The other combine brings together International Aluminum and American Aluminum Extruders (see "Financial Briefs," p. 105). The new company will have five extrusion presses in two plants.

— The Editors

Why "COBEHN" Swung To Aluminum...

To Lick *RISING COSTS*



Sales soaring, but profits sagging. That was the problem confronting Cobehn, Inc.

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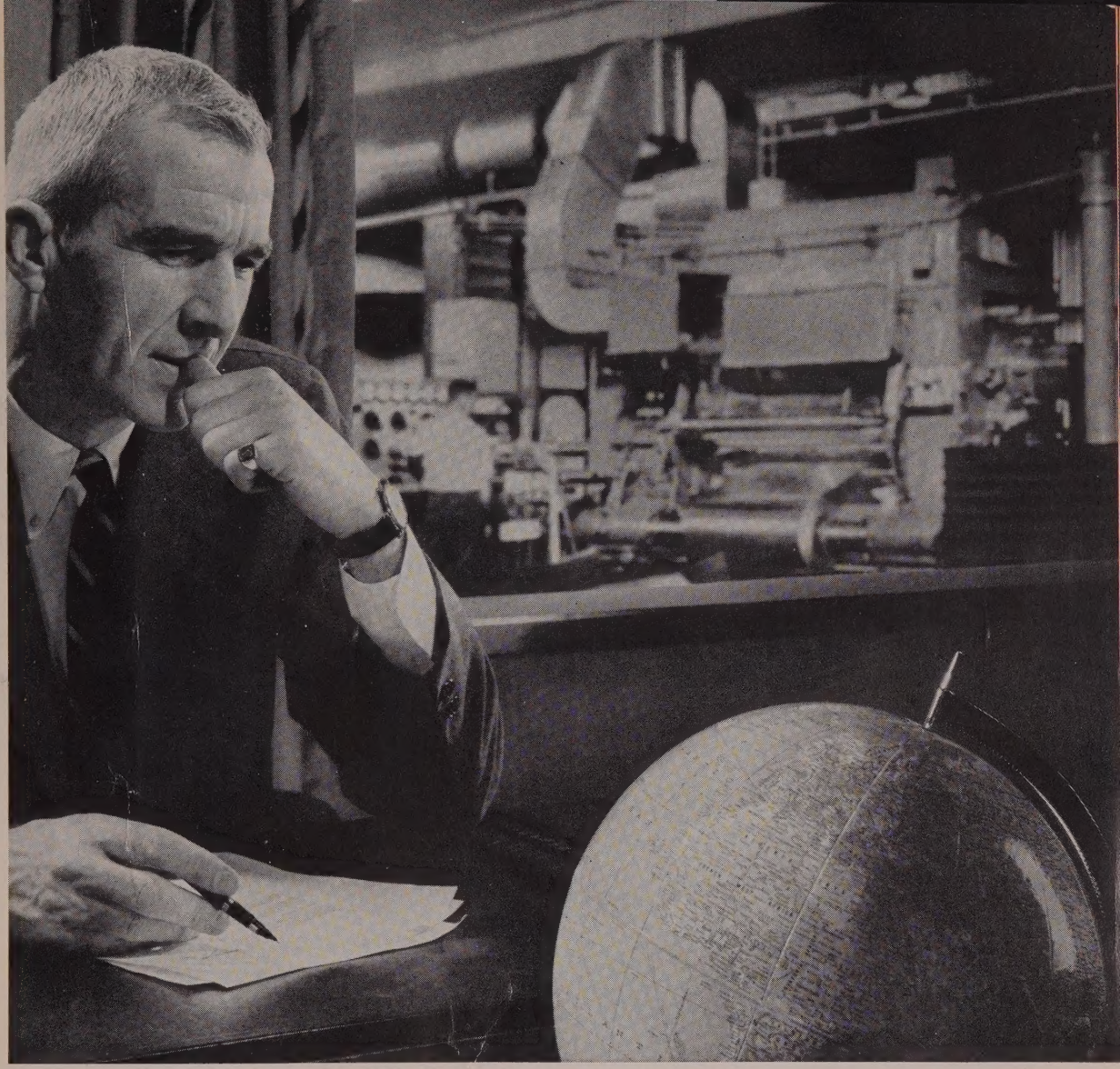

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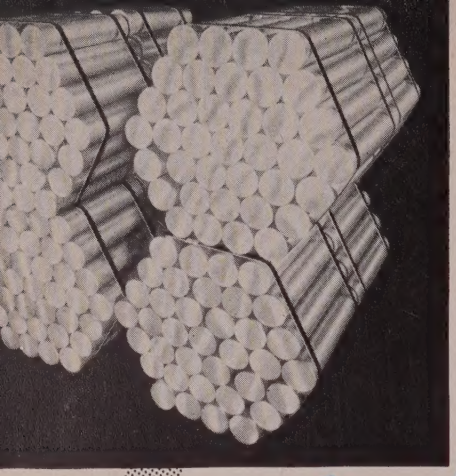

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